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Essentials of Obstetrics

W. E. Ashton, M. D.

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EDITED BY

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Assistant Obstetrician to the Hospital of the University of Pennsylvania.

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ESSENTIALS OF OBSTETRICS

ARRANGED IN THE FORM OF

QUESTIONS AND ANSWERS

PREPARED ESPECIALLY FOR

STUDENTS OF MEDICINE.

BY

WILLIAM EASTERLY ASHTON, M. D.,

PROFESSOR OF GYNÆCOLOGY IN THE MEDICO-CHIRURGICAL COLLEGE OF PHILADELPHIA; OBSTETRICIAN TO THE PHILADELPHIA HOSPITAL.

FIFTH EDITION, REVISED AND ENLARGED.

SEVENTY-FIVE ILLUSTRATIONS.

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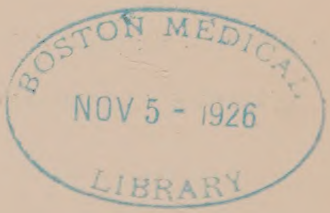

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PREFACE TO FIFTH EDITION.

A CONSTANT and increasing demand for this book has necessitated issuing the fifth edition within a comparatively short time. In preparing this edition the work has been thoroughly revised and the most recent progress has been incorporated, so that the volume continues to represent a practical, up-to-date presentation of the accepted teaching of the best obstetric authorities. The flattering reception accorded the work by the medical press, together with the rapid sale of several editions, indicates that the book possesses features of distinct value for meeting the needs of students and practitioners.

W. A. NEWMAN DORLAND.

PREFACE TO FIRST EDITION.

This manual is to assist the student in mastering the *essentials* of the science and art of obstetrics. As a work of this kind must of necessity be limited in its character, the author has relied upon his experience as a teacher for the selection of such matter as, in his judgment, will prove of most value.

He has endeavored to present in a clear and concise manner the views of the present day, and the standard works of Parvin, Goodell, Lusk, Playfair, Hirst's *American System of Obstetrics*, Winckel's *Diseases of Women*, Hart and Barbour, Thomas, Emmet, and Charpentier's *Cyclopædia of Obstetrics and Gynecology* have been consulted.

The chapter on *obstetric auscultation* and *palpation* has been fully discussed and embodies the didactic and bedside instructions of Prof. Parvin.

In the preparation of the chapter on *Cæsarean section* the writer is indebted to an article written by Dr. Gustav Zinke, the illustration showing the deep and superficial uterine sutures being taken from the same source.

He is also indebted to his friend Dr. Henry H. Sherk for several of the illustrations, and to his former student Dr. James C. Bloomfield for the preparation of the index.

William Easterly Ashton.

222 South Eighth Street, Philadelphia.

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ESSENTIALS OF OBSTETRICS.

INTRODUCTION.

What is obstetrics?

The care of women during pregnancy, labor, and in the puerperal state.

What are the synonyms for obstetrics?

Tocology, parturition, midwifery, accouchement, and maieutics.

What do you mean by the science and art of obstetrics?

"Obstetric science means the classified knowledge of the laws of human reproduction; obstetric art includes the rules drawn from those laws or from intelligent experience."

ANATOMY OF THE PELVIS.[1]

What bones form the anatomical pelvis?

The coccyx, sacrum, and the ossa innominata.

What bones form the obstetric pelvis? See fig. 1.

The coccyx, sacrum, ossa innominata, and the last lumbar vertebra.

What is meant by the static pelvis?

The bony pelvis.

What is meant by the dynamic pelvis?

"The pelvis in the living subject and in labor."

[1] For the anatomical description of the pelvis the student is referred to his text-books.

How is the pelvis divided?

Into two parts: one, the upper, false or greater pelvis; the other, the lower, true or lesser pelvis.

What is the dividing line between the true and false pelvis?

The ilio-pectineal line.

What are the four cardinal points of Capuron?

The right and left sacro-iliac joints, and the right and left ilio-pectineal eminences.

What is the promontory or sacro-vertebral angle?

The prominence formed at the point of articulation of the sacrum with the spine.

What bones form the anterior, lateral, and posterior walls of the true pelvis?

The anterior and lateral walls are formed by the innominate bones; the posterior wall by the last lumbar vertebra, the sacrum, and coccyx.

What is the length of the anterior, lateral, and posterior walls of the true pelvis?

The anterior wall measures from 4 to 4½ cm. (1½ to 1¾ in.); the lateral 9 to 9½ cm. (3½ to 3¾ in.); the posterior 12⅔ cm. (5 in.), or, following the curve of the sacrum and coccyx, 14 cm. (5½ in.).

The Pelvic Joints.

How many joints unite the bones of the obstetric pelvis?

Seven.

Name them.

One pubic; one sacro-coccygeal; two sacro-iliac; and three sacro-vertebral.

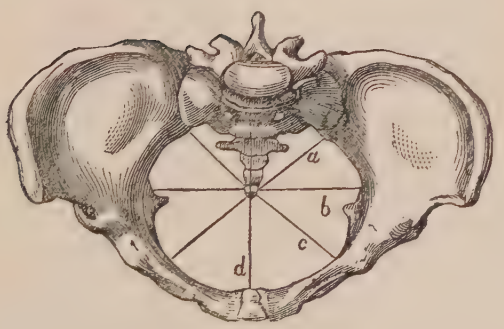
What joints are amphiarthrodial?

The pubic, the sacro-coccygeal, the sacro-iliac, and the articular surface of the body of the last lumbar and the first sacral vertebræ.

FIG. 1.

Female pelvis.

FIG. 2.



Plane of the brim of the pelvis.

What joints are arthrodial?

The two articulations formed by the articular processes of the last lumbar and first sacral vertebræ.

Are any of the diameters of the pelvis increased or diminished by movements in the pelvic joints?

The antero-posterior diameter of the outlet is increased by the movement in the sacro-coccygeal joint; this movement may occur between the first and second bones of the coccyx; less frequently between the second and third, or between the third and fourth. It is probable that there is a lessening of the antero-posterior diameter of the inlet, with an increase in the corresponding diameter of the outlet caused by the elevation and depression of the pubic joint; this may be produced either by the sacrum moving forward upon an imaginary transverse line, or by the movements of the iliac bones on the sacrum itself. The antero-posterior diameter of the inlet is increased by placing the woman in Walcher's posture, the weight of the limbs dragging the symphysis down and away from the promontory of the sacrum.

What are the functions of the pelvic joints?

In addition to their influence upon the pelvic diameters already referred to, they decompose forces received by the lower extremities, and thus prevent sudden shocks being transmitted directly to the contents of the pelvis.

What changes occur in the pelvic joints during pregnancy?

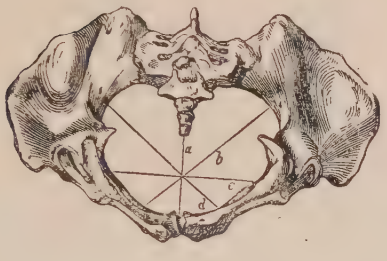
The ligaments become elongated and swollen, the fibro-cartilages distended with serum and softened, and there is a slight separation between the bones. These changes are most marked in the pubic joint; they can be demonstrated by introducing the finger into the vagina and pressing against the inferior border of the symphysis, at the same time directing the patient to stand first on one foot and then on the other.

The Pelvic Inlet.

What is the pelvic inlet?

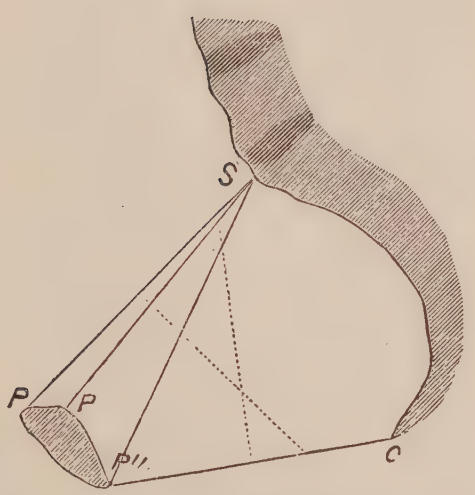
The entrance to the cavity of the pelvis.

FIG. 3.



The outlet of the pelvis.

FIG. 4.



Anterior posterior diameters of inlet. *S, P.* Sacro-supra-pubic diameter. *S, P*I. Sacro-subpubic diameter. *S, P*II. Minimum diameter.

How is it bounded? See fig. 2.

Posteriorly, by the promontory and the anterior edge of the alæ of the sacrum; laterally, by the ilio-pectineal line; anteriorly, by the ilio-pectineal eminences, and the posterior edge of the oblique rami and body of the pubes.

What are the synonyms for the inlet?

Margin, isthmus, and superior strait or brim.

What is the shape of the inlet?

It is heart-shaped; pointed in front, and encroached upon posteriorly by the promontory.

What are the diameters of the inlet?

An antero-posterior; a transverse; and two oblique diameters (right and left).

Between what points are the diameters taken?

The antero-posterior (sacro-supra-pubic, or conjugate) extends from the central point of the upper margin of the symphysis to the sacral promontory; it measures 11 cm. (4.3 inches).

The two oblique diameters connect the four cardinal points of Capuron; that starting from the left sacro-iliac synchondrosis being named the left, that from the right, the right oblique; they each measure $12\frac{3}{4}$ cm. (about 5 inches). The transverse or bis-iliac is the widest measurement between the ilia, averaging $13\frac{1}{2}$ cm. (about 5.3 inches).

What does the circumference measure?

About 40 cm. ($15\frac{3}{4}$ inches); according to Parvin, 15.8 inches; Lusk, 16 inches.

The Pelvic Outlet.

How is the pelvic outlet bounded? See fig. 3.

Posteriorly, by the coccyx; anteriorly, by the subpubic ligament; and on either side by the ischio-pubic ramus, the tuberosity of the ischium, and the sciatic ligaments.

What is the shape of the outlet?

Cordate at rest; almost circular in labor.

What are the diameters of the outlet?

An antero-posterior; a transverse; and two oblique diameters (right and left).

Between what points are the diameters taken?

The antero-posterior (coccy-pubic or conjugate) extends from the subpubic ligament to the tip of the coccyx; it measures 9½ cm. (3¾ inches), increasing to 11 cm. (4⅓ inches) in labor. The transverse (bisischiac) is measured between the inner borders of the ischial tuberosities (11 cm. or 4⅓ inches). The oblique diameters connect on either side the middle of the inferior surface of the great sacro-sciatic ligament with the point of union of the ischio-pubic rami; they measure 12¾ cm. (about 5 inches).

Are the oblique diameters of the outlet considered of obstetric importance?

No; owing to the yielding of the sciatic ligaments.

Is the antero-posterior diameter increased during labor?

Yes; 1½ cm. (about one inch) by the retrocession of the coccyx.

What does the circumference of the outlet measure?

34½ cm. (about 13½ inches).

The Pelvic Cavity.

How is the pelvic cavity bounded?

By the inlet above and the outlet below.

What is its shape?

Irregularly barrel-shaped.

Is the bony wall of the cavity complete in any horizontal pelvic plane?

No; for example, the movable coccyx is opposite the pubic symphysis, and thus at all points of the cavity there is motion, protecting from pressure the fœtus and the mother.

Into how many sections is the pelvic cavity divided?

Two; an anterior and posterior inclined plane.

What line divides these planes?

A line passing between the ilio-pectineal eminences and the spine of the ischium on each side. The anterior plane is directed downward and forward, while the posterior inclines toward the sacrum and coccyx.

What are the diameters of the cavity of the pelvis?

An antero-posterior; a transverse; and two oblique diameters (right and left).

Between what points are the diameters taken?

The antero-posterior diameter extends from the middle of the pubic symphysis to the middle of a line between the second and third sacral vertebræ, or, as taught by some authorities, to the centre of the third sacral vertebra. The transverse intersects in the same plane the conjugate and oblique diameters. The two oblique diameters are measured from the centre of each great sciatic foramen to the centre of the ischio-pubic foramen of the opposite side.

What do the diameters measure?

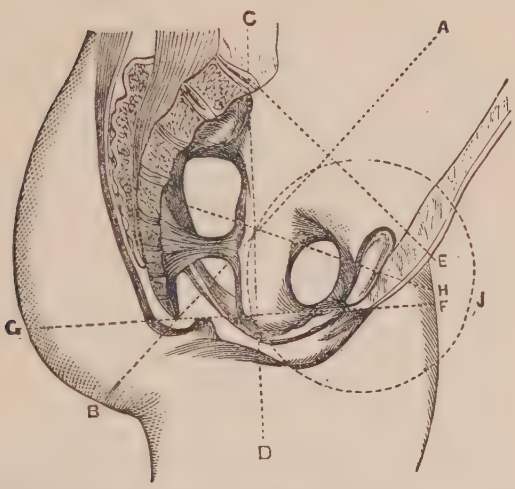
	Parvin.	*Playfair.*
A. P.,	12 cm. (about 4¾ inches).	12¾ cm. (about 5 inches).
T.,	" " "	10¾ cm. " 4.2 "
O.,	" " "	

The antero-posterior measurements increase from above below, while the transverse decrease.

What are some of the other diameters of the pelvis? Fig. 4.

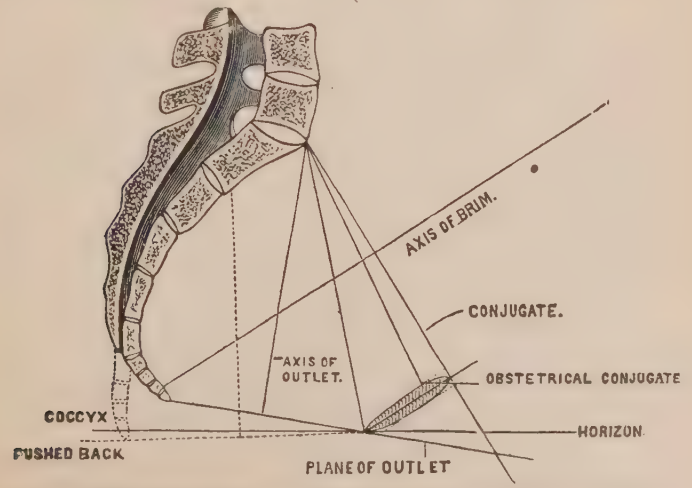
1. The sacro-cotyloid diameter, which extends from the promontory to a point immediately above the cotyloid cavity; it

FIG. 5.



A, *B*, forms with the horizon, *F*, *G*, an angle of about 55°. *C*, *D*, a line from the promontory of the sacrum to the space between the tuberosities of the ischia—the line *H* indicates the plane of the cavity of the pelvis. The circle, *J*, is the circle or curve of Carus.

FIG. 6.



Section showing the inclination of the pelvis according to Naegele. (Tarnier et Chantreuil.)

measures 9½ cm. (3¾ inches). 2. The sacro-subpubic, lower, or inclined conjugate diameter, from the subpubic ligament to the sacro-vertebral angle. 3. The minimum, useful, or obstetric diameter, beginning about two-fifths of an inch below the upper border of the symphysis, and extending to the promontory. 4. The sacro-pectineal diameter, from the promontory to the upper border of the oblique ramus of the pubic bone, below the subpubic angle. 5. The diagonal conjugate, from the superior margin of the pubes to the centre of the third sacral vertebra.

The Obliquity, Planes, and Axes of the Pelvis.

What is meant by the obliquity of the pelvis? See fig. 5.

The angle which the pelvis forms with the spinal column.

What are the causes of this obliquity?

First, the cartilage between the sacrum and the last lumbar vertebra is twice as thick in front as it is behind; second, the body of the fifth lumbar vertebra is thicker in front than behind; third, the obliquity of the articulating surface of the first sacral vertebra; and fourth, the obliquity of the articulation of the innominate bones with the sacrum.

What angle does the antero-posterior diameter of the inlet make with a horizontal line?

Nægele makes the angle 60 degrees, the patient standing.

What angle does the diagonal conjugate make with a horizontal line?

Mayer makes the angle 30 degrees.

What angle does the antero-posterior diameter make with the axis of the body?

An angle from 130 to 140 degrees.

What angle does the antero-posterior diameter of the outlet make with a horizontal line?

An angle from 10 to 11 degrees.

Does the retrocession of the coccyx affect the size of this angle?

Yes; it changes with the movements of the coccyx during labor.

What is the height of the sacro-vertebral angle above the upper surface of the pubic symphysis?

About 9½ cm. (3¾ inches).

At what point would a line touch passing horizontally backward from the upper margin of the symphysis?

The junction of the second and third bones of the coccyx.

Does the pelvic inclination remain in a fixed state?

No; it changes with the different positions of the body.

What do you mean by the planes of the pelvis? See fig. 6.

Imaginary surfaces touching all the points of the circumference at any portion. Thus we speak of the plane of the inlet and outlet, and also the planes of the pelvic cavity. The planes of the cavity are not parallel; starting from the posterior wall they converge and meet in front of the symphysis pubis.

What do you mean by the axis of the inlet and outlet?

A line drawn perpendicular to the centre of their planes. If the axis of the inlet be continued upward it would pass out at the umbilicus; backward it would strike the apex of the coccyx, or the sacro-coccygeal joint. The axis of the outlet continued upward, intersects the axis of the inlet at the centre of the pelvic cavity, and ends at the promontory; if the coccyx be pushed backward, it strikes the lower edge of the first sacral vertebra. Continued backward it passes out at the perineum near the anus.

What do you mean by the axis of the cavity?

An imaginary curved line passing through the pelvic cavity, and at all points equally distant from the pubic symphysis and the sacrum and coccyx; it represents the sum of the axes of a series of planes at various levels of the pelvic cavity. It is called the *curve of Carus.*

Is the relation between the pelvic axes and the pelvic planes unchangeable?

Yes.

Is the relation of the planes and axes to the body unchangeable?

No; for example, if the subject is in the erect position, the plane of the inlet is almost horizontal; in the recumbent position, however, the plane is nearly vertical.

The Soft Parts of the Pelvis.

What are the functions of the psoas and iliacus muscles?

The ilio-psoas muscles, acting from above, flex the thigh and rotate it outward; from below, the muscles of both sides pull the spine and pelvis forward. When the body is recumbent they assist in raising the trunk; they also uphold the erect position. The iliacus muscle serves as a support to the impregnated uterus, and assists in labor.

What modifications are produced in the bony pelvis by the soft parts?

They lessen the pelvic diameters, the depth of the iliac fossæ, and the obliquity of the iliac bones. They also change the direction of the pelvic axis.

What pelvic diameters are lessened?

At the inlet, the transverse diameter is decreased about 1½ cm. (½ inch) by the ilio-psoas muscles; the oblique diameters are decreased one-eighth of an inch, the left oblique being still further lessened by the presence of the rectum.

In the cavity all the diameters are lessened from one-fifth to one-quarter of an inch.

What muscles lessen the depth of the iliac fossæ?

The iliacus muscles.

What muscles lessen the obliquity of the iliac bones?

The psoas muscles.

What changes are produced in the direction of the pelvic axis by the soft parts?

A curved line equally distant from the sacrum and the pubes represents the axis of the static pelvis; this, however, is not true of the dynamic pelvis. The dynamic pelvis presents a cavity which is a cylindrical canal, having an anterior and a posterior wall, nearly vertical. The fundus of this cavity is at the coccyx and its opening upon the anterior wall. The axis, therefore, of the birth-canal "is at first a line directed backward and downward, and then a line almost perpendicular to it."

What is the pelvic floor?

"The pelvic floor is a thick, fleshy, elastic layer, dovetailed all round to the bony pelvic outlet."

What are the synonyms for the pelvic floor?

Pelvic diaphragm, inferior wall of the pelvis, perineal wall, and perineum.

What organs perforate the pelvic floor?

The rectum, vagina, and urethra.

How are these openings closed?

The vagina and the urethra by the apposition of their walls; the rectum by the contraction of its sphincter.

What structures enter into the formation of the pelvic floor?

The peritoneum, subperitoneal cellular tissue, aponeurotic fasciæ, muscles, superficial fascia, and skin.

What organs lie on the outer or skin surface of the pelvic floor?

The external organs of generation.

What organs lie on the inner or peritoneal surface?

The uterus and its annexa.

Describe the peritoneum lining the pelvic floor.

At the symphysis pubis the peritoneum is reflected from the anterior abdominal wall on to the bladder, and passing over its pos-

terior surface it crosses on to the uterus at the isthmus, forming a pouch, called the vesico-uterine cul-de-sac. It covers all of the anterior surface of the uterus above the isthmus, and passing over the fundus it invests the posterior surface down to the vaginal junction. From this point it continues downward on the posterior wall of the vagina for about four-fifths of an inch, and is then reflected on to the anterior wall of the rectum; the pouch formed at this point is called Douglas's, or the retro-uterine or recto-uterine cul-de-sac.

What is the perineum?

That part of the floor of the pelvis which is bounded, externally, by the anus, the tuberosities of the ischia, and the vulvar opening; internally, by the walls of the rectum and vagina.

What is the length of the perineum from the anus to the vulvar opening?

In the parous less than an inch, in the nulliparous somewhat over an inch. During pregnancy it measures an inch and a half, and in labor it is extended by the presenting part to five inches and a half.

Upon what does the distensibility of the perineum depend?

The perineal body.

What is the perineal body?

A mass of elastic and muscular tissue, placed in the centre of the perineum.

How is the pelvic floor in its relations to labor divided?

Into a pubic and a sacral segment.

Describe these segments.

"The pubic segment is made up of loose tissue, viz., bladder, urethra, anterior vaginal wall, and bladder-peritoneum. It is attached in front to the symphysis pubis."

"The sacral segment is attached to the coccyx and sacrum; it consists of rectum, perineum, and strong tendinous and muscular tissue."

What effect has labor upon these segments?

The contractions of the uterus pull up the pubic segment, while the sacral segment is pushed down by the presenting part.

In what direction does the vagina pass through the pelvic floor?

Obliquely, parallel to the antero-posterior diameter of the inlet.

The Female Generative Organs.[1]

How are the organs of generation divided? See fig. 7.

1st. Internal, viz., the uterus and its appendages (the ovaries and oviducts); and the vagina.

2d. External, viz., the mons veneris, labia majora and minora, clitoris, vestibule, fossa navicularis, hymen, and fourchette; and also the mammary glands.

What term is used to include all of the external organs?

The pudendum or pudendum muliebre. The vulva does not include the mons veneris, although it is occasionally used as a synonym.

What is the reaction of the vaginal secretions?

Acid.

What is the reaction of the glandular secretions of the uterus?

Alkaline.

What is the direction of the current produced by the ciliæ of the epithelium of the uterus?

Toward the oviducts.

What is the direction of the current produced by the ciliæ of the oviducts?

Toward the uterus.

What are the functions of the vagina?

1st. An organ of copulation.

[1] The anatomy of the organs is to be found in the text-books.

FIG. 7.

External organs of generation (in the virgin). 1, labium majus; 2, fourchette; 3, the nympha; 4, glans clitoridis; 5, meatus urethræ; 6, vestibule; 7, orifice of vagina; 8, hymen; 9, orifice of the glands of Duverney; 10, anal orifice. (Sappey.)

FIG. 8.

Segmentation of the ovum. *A*, the ovum divided into two cells; *B*, the two cells divided into four; *C*, the four cells divided into eight; *D*, by repeated segmentation the ovum has become a round, mulberry-shaped mass—the *morula*. (Haeckel.)

2d. An excretory canal for the uterus.
3d. An organ of parturition.

What are the functions of the uterus?

1st. An organ of gestation.
2d. An organ of parturition.

What is the function of the ovary?

Spontaneous ovulation.

What uses have the oviducts?

They convey the spermatozoids to the ovaries, and the ovules pass through them to the uterus.

What is the function of the vulvo-vaginal glands?

They secrete a viscid mucus, which lubricates the parts during coition.

What is the vestibule?

It is a triangular-shaped space, bounded at its apex by the clitoris, on its sides by the nymphæ, and at its base by the anterior edge of the vaginal opening. It is of importance on account of the situation of the meatus urinarius, which is placed a little above the middle of its base.

What methods are used in the introduction of the catheter?

It may be introduced either by means of sight or touch.

1. Touch. Insert the index finger into the vagina, its palmar surface looking upward, and make moderate pressure against the anterior wall of the vagina; now pass the catheter along the finger until the opening of the vagina is reached, and then by slightly elevating the point of the instrument it will pass into the urethra.

Separate the nymphæ, at the apex of the vestibule, with the index finger, and pass it down toward the vagina until the meatus is felt at its base; the urethro-vaginal tubercle is an important guide in this method, as the meatus is placed just above it.

2. Sight. This method of introduction is useful when the parts are swelled during labor, and is always preferable because of the lessened danger of septic infection.

EMBRYOLOGY.

Describe the changes which take place in the ovum after impregnation. See figs. 8, 9, and 10.

1. The germinal vesicle immediately disappears.

2. The union of the male with the female pronucleus; the former is the head of the spermatozoid, while the latter is the remains of the germinal vesicle.

3. Cleavage or segmentation of the vitellus; this process continues until the vitellus is completely subdivided, forming a mulberry-like mass, called the muriform body.

4. The outer cells of the muriform body arrange themselves in a single layer beneath the vitelline membrane, and enclose the inner or smaller cells. The blastopore is the point at which the inner cells are not completely covered over.

5. Next the opening of the blastopore closes.

6. The blastodermic vesicle is now formed by the appearance of a fluid which separates the inner and outer cells; the former collecting in a mass, and adhering to the latter at a point which was originally the blastopore.

7. A third layer next appears between the outer and inner layers of cells. The blastodermic vesicle is now composed of three layers, viz., the external, or epiblast; the middle, or mesoblast; and the internal, or hypoblast.

8. The area germinativa is now developed; it can be seen by removing the vitelline membrane and exposing the epiblast. It is oval in shape; its central portion is light in color (area pellucida); and it is surrounded by an opaque area (area opaca).

9. Next there appears within the area pellucida a groove or furrow (primitive groove); this eventually becomes the spinal canal.

10. Folds grow upward from the sides of the primitive groove and arching over unite with each other, forming the spinal canal; these folds are called the dorsal plates. Projecting forward from the bases of these plates are two folds (abdominal plates), which eventually unite with each other, and enclose the cavity of the abdomen.

11. In growing forward the abdominal plates divide the blasto-

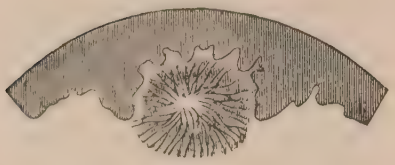
FIG. 9.

a o, area opaca; *a p*, area pellucida; with beginning formation of embryo from the embryonic spot. From the ovum of a rabbit on the ninth day. Owing to the advanced stage of development, the area pellucida has lost its primitive shape, and presents the appearance of a constricted ovoid. (Kölliker.)

FIG. 10.

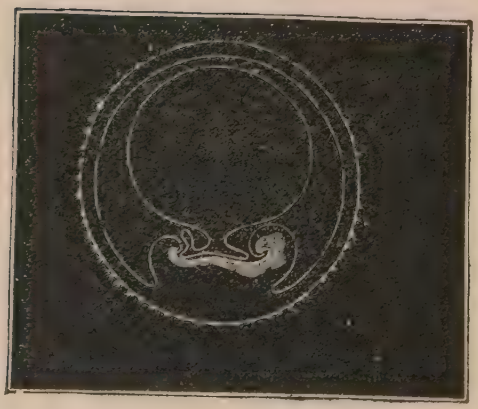
Transverse section of egg in early stage of development. 1, external and median layers of blastodermic membrane; 2, 2, dorsal plates; 3, internal layer of blastodermic membrane. (Dalton.)

FIG. 11.



Formation of the decidua, first stage.

FIG. 12.



Section of ovum.

dermic vesicle into two parts, the external portion of which is the yelk sac (umbilical vesicle), while the internal is embryonic; the vitelline duct is the canal between them. The omphalo-mesenteric artery and vein and intermediate capillaries are seen on the surface of the umbilical vesicle.

Describe the changes in the mucous membrane of the uterus incident to pregnancy. See fig. 11.

These consist in the formation of the deciduous membranes When the ovum reaches the uterus the mucous membrane of the latter "is swelled and thrown into folds," and the ovum finds a lodgement in one of the spaces between these folds. That part of the mucous membrane upon which the ovum rests is called the placental decidua, or membrana (decidua) serotina; the folds which surround it are the ovular decidua, or decidua reflexa; and all the rest of the mucous membrane of the cavity of the uterus is the uterine decidua, or decidua vera. The folds, forming the ovular decidua, grow, and arching over the ovum, unite and completely surround it. By the end of the third month the ovular decidua and the uterine decidua unite; they then begin gradually to atrophy and separate from the uterus.

Describe the development of the amnion. See fig. 12.

From the sides of the embryo, and also from its caudal and cephalic ends, the epiblast rises up into folds, which finally meet and form a complete sac. These folds consist of an external and internal layer; the former, or false amnion, unites with the vitelline membrane; while the latter, or true amnion, forms the most internal of the membranes covering the fœtus.

Describe the development of the allantois.

During the development of the amnion (the 20th day) the umbilical vesicle begins to disappear, and the allantois is seen springing from the terminal portion of the intestine. At first it is sausage-like in shape, but afterward it becomes spread out and fuses with the internal surface of the false amnion.

Describe the development of the chorion.

About the twelfth day the zona pellucida becomes covered

with small solid villi; it is then called the primitive chorion. A little later, the permanent chorion is formed by the union of the primitive chorion with the false amnion and the allantois. The vessels of the allantois penetrate into the villi of the chorion, which now become vascular and take on hypertrophy. This hypertrophy continues until the third month when all the villi atrophy, except those attached to the placental decidua, which, continuing to enlarge, assist in the formation of the placenta.

The chorial villi, up to the third month, are often spoken of as the "shaggy coat," or *chorion frondosum.*

How many days does the ovum take in passing through the oviduct?

About eight or ten days.

What is its size when it enters the uterus?

That of a small pea.

What is the function of the allantois?

To carry the allantoic arteries to the chorion, thus assisting in the development of the placenta.

What is the function of the chorion?

To assist in the formation of the placenta.

What are the fœtal appendages?

From without in: the deciduæ, chorion, and amnion; the placenta and cord are also included.

What are the uses of the liquor amnii?

During pregnancy:

1. To prevent injury to the contents of the uterus.
2. To assist in the movements of the fœtus, and also to lessen their inconvenience to the mother.
3. To aid in the development of the fœtus and uterus.
4. To nourish the fœtus.

During labor:

1. To protect from pressure the fœtus and cord.
2. To assist in the dilatation of the os uteri.
3. To lubricate and cleanse the birth-canal.

Describe the development of the placenta.

It begins to develop at the third month, and is completely formed by the fourth. The chorial villi, which are in relation with the placental decidua, continuing to grow dip down into the mucous membrane. Meanwhile the placental decidua sends out villi which interlock with those of the chorion, thus forming a close connection between the two. Blood sinuses now appear in the maternal part of the placenta, into which bloodvessels from the mother pass in and out; the chorial villi float in these sinuses.

What is the usual situation of the placenta?

Upon the anterior or posterior wall, near the orifice of one of the oviducts.

What are the functions of the placenta?

1. Nutrition.
2. Respiration.
3. "An emunctory for the products of excretion in the fœtus."
4. A glycogenic function.

When does the umbilical cord begin to develop?

At the end of the fourth week.

From what structure is the cord developed?

The stalk of the allantois; it has originally two arteries and two veins.

What structures compose the fully developed cord?

Wharton's jelly, the umbilical vein and arteries, and traces of the stalk of the allantois and umbilical vesicle; these are all inclosed in a sheath derived from the amnion.

To what part of the placenta is the cord usually attached?

Midway between its centre and margin.

What is a battledore placenta?

A placenta in which the cord has a marginal attachment.

DEVELOPMENT OF THE FEMALE GENERATIVE ORGANS.

External Organs. See fig. 13.

What is the cloaca?

The terminal portion of the intestine after the formation of the vesicle of the allantois; it is the opening common to the allantois, the intestine, and the Wolffian ducts.

How long does the cloaca remain?

Until the middle of the third month, when it is divided by a wall, thus forming the rectal and uro-genital cavities.

How long does the uro-genital cavity remain?

Until some time in the fourth month, when it is divided into the urethra and vagina.

From what is the clitoris developed?

The genital tubercle.

What is the genital tubercle?

The genital swelling or tubercle is a prominence in front of the opening of the cloaca.

From what are the labia majora developed?

The genital folds.

What are the genital folds?

Two folds, placed one on either side of the genital tubercle and the orifice of the cloaca.

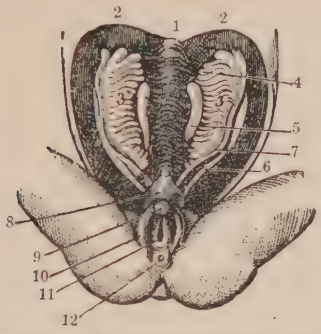
From what are the labia minora developed?

From the sides of the genital fissure or furrow.

What is the genital fissure?

A furrow extending from the lower part of the genital swelling to the orifice of the cloaca.

FIG. 13.



Rudimentary sexual organs. The internal organs represented at the seventh week of fœtal life; the external organs belong to a later period. 1, spinal column; 3, 3, Wolffian bodies; 5, glands destined to become the ovaries in the female, the testicles in the male; 6, Wolffian duct; 7, filaments of Müller; 8, bladder; 9, tubercle, forming the rudiment of either the clitoris or penis; 10, folds destined to form the labia majora (in the male the scrotum); 11, sinus uro-genitalis; 12, anus. (Luschka.)

FIG. 14.

Course of fœtal circulation.

From what is the perineum developed?

From the lower surface of the wall which divided the cloaca into two cavities.

Internal Organs. See fig. 13.

From what are the internal organs of generation developed?

The Wolffian bodies and Müllerian ducts.

What are the Wolffian bodies?

They are two glandular bodies placed one on either side of the spinal column during embryonic life.

What is the structure of a Wolffian body?

It is composed of a series of fine tubes, placed in a transverse position, which empty into an excretory duct, known as the Wolffian duct.

What are the synonyms for the Wolffian body?

The primitive, false, or primordial kidney; also the kidney of Oken.

What is a Müller's duct?

A duct developed on the outer surface of the Wolffian body.

How many Müllerian ducts are there?

Two; one for each Wolffian body.

Describe their development.

They begin as a layer of germinative epithelium which dips down into the structure of the outer surface of the Wolffian body. These depressions eventually become covered over, thus forming two tubes or canals.

What organs are derived from Müller's ducts?

The oviducts, uterus, and vagina.

Describe their formation.

The ducts of Müller, passing forward, unite in the median line, at a point situated below the round ligaments. Above, they

remain separated, forming the oviducts, but below the round ligaments they are in apposition with one another, thus forming the uterus and vagina; the fusion of the two tubes is complete by the eighth week. The extremity of each tube forms the ampulla or pavilion. The presence of a secondary ampulla is readily understood, by the failure of the original gutter, from which the tube developed, to close completely over at a given point. After fusion has taken place between the two tubes, below the round ligaments, the intervening partition is absorbed, thus, that which was at first a double uterus and vagina, now becomes two single organs.

Describe the development of the ovary.

An elongated mass of embryonic connective tissue covered by germinative epithelium appears on the inner surface of the Wolffian body; this is the beginning of the development of the ovary. The stroma of the ovary is derived from the connective tissue while the ovules and ovisacs are developed from the epithelium. The primordial ovules appear in the epithelium as round cells, having a nucleus and nucleolus. The ovisacs are developed from the epithelium, which adheres to the ovules as they dip down into the structure of the ovary.

What is the cause of anomalies of the uterus?

An arrest of fœtal development.

What is a uterus unicornis?

A one-horned uterus. It is caused by an incomplete development of one of Müller's ducts; generally there is but one oviduct.

What is a uterus duplex?

It is simply two uteri, caused by the failure of the fully developed Müller's ducts to unite.

What is a uterus bicornis?

A two-horned uterus. It is caused by a partial union between the ducts of Müller—*i. e.*, they unite, but below the normal point.

What is a uterus cordiformis?

A uterus in which there is an incomplete development of the fundus; it is depressed, and resembles in shape the heart of a playing-card.

What is a uterus septus bilocularis?

A uterus which has two cavities; a double uterus. It is caused by the walls of Müller's ducts not being absorbed. A uterus semipartitus has two uterine cavities with a single cervix.

Will any of these anomalies prevent pregnancy?

No.

Development of the Embryo and Fœtus.

What do you mean by the terms embryo and fœtus?

The product of conception is known as an embryo up to three months, after which it is called a fœtus.

Describe the development of the embryo and fœtus in the successive months of pregnancy.

FIRST MONTH:

Size.—12th day the ovum measures $\frac{2}{3}$ cm. ($\frac{1}{5}$th inch); 15th day the embryo is $\frac{1}{12}$th of an inch; 20th day $\frac{1}{8}$th of an inch; 21st day $\frac{1}{6}$th of an inch; and at the end of the month 1$\frac{1}{2}$ cm. (about $\frac{1}{2}$ inch); the ovum being the size of a pigeon's egg.

Structure.—12th day it is composed of the vitelline membrane covered with villi, and of the blastodermic vesicle; 15th day of the primitive groove, amnion, allantois, and the umbilical vesicle. The heart is also seen, a simple cavity, and commencing to beat, the vitelline circulation is established; the Wolffian ducts also begin to develop; 18th day the heart is S-shaped; 20th day the visceral arches and clefts are seen; 21st day the heart has four cavities, and the eyes, ears, and mouth begin to develop; at the end of the month rudimentary limbs are seen.

SECOND MONTH:

Size.—The ovum is the size of a hen's egg; the embryo is from 3$\frac{1}{2}$ to 4 cm. (1 to 1$\frac{1}{2}$ inches) in length, and weighs 1 drachm. The umbilical cord is 2$\frac{1}{2}$ cm. (about 1 inch) in length.

Structure.—The visceral arches and clefts close; hare-lip and cleft-palate are impossible subsequent to the second month. The eyelids and external ears are seen; about the middle of the month the external organs of generation begin to develop, and about the

seventh week the testicles or ovaries are seen. The fingers and toes are indicated, but they are fused together. The umbilical vesicle, reduced in size, hangs from the embryo by a narrow stalk.

THIRD MONTH:

Size.—The ovum is as large as a goose's egg; the fœtus is from 8¾ to 9 cm. (3 to 3½ inches) long, and weighs from 5 drachms to 1 ounce. The umbilical cord is 6¼ cm. (2½ inches) long, and begins to assume a spiral form.

Structure.—The placenta is fully developed by the end of the month. The fingers and toes are separated, and membrane-like nails appear. The eyes are closer together and the ears well developed. Spina bifida is seldom anterior, and more often lumbar than dorsal or cervical. This is accounted for by the fact that ossification takes place last in the lumbar vertebræ and that the bodies are the first portion to become ossified.

FOURTH MONTH:

Size.—Length, 16 cm. (6½ in.); weight, 4 ounces. The cord measures 19 cm. (7½ in.), and the gelatine of Wharton is formed.

Structure.—The external organs of generation are developed, and the sex can be distinguished by the middle of the month. Lanugo (soft fine hair) is seen on the body, and hair begins to develop on the scalp. Slight movements of the extremities occur.

Vitality.—If born at the end of the month, the fœtus may live a few hours.

FIFTH MONTH:

Size.—Length, 25 cm. (almost 10 in.); weight, 10 ounces; cord 30½ cm. (12 in.) long.

Structure.—Movements are distinct and felt by the mother about the middle of the month. The vernix caseosa is seen.

Vitality.—If born at the end of the month, the fœtus breathes and cries feebly, dying in a few hours.

SIXTH MONTH:

Size.—Length, 30 cm. (about 12 in.); weight, 1 pound.

Vitality.—If born, the fœtus lives from 1 to 15 days.

SEVENTH MONTH:

Size.—Length, 35 cm. (13¾ in.); weight, 3 to 4 pounds.

Structure.—The testicles are felt near the scrotum, and the nails are almost completely developed.

Vitality.—The fœtus is viable. The artificial feeding of premature children by means of a stomach tube (gavage) places the period of viability much earlier.

EIGHTH MONTH:

Size.—Length, 40 cm. (15¾ in.); weight, 4 to 5 pounds.

NINTH MONTH (fœtus at term):

Length, 50 or 51 cm. (19½ to 22 in.); weight, 6 to 7 pounds. The body is plump; the lanugo has nearly disappeared; the nails of the fingers and toes are hard, the former projecting beyond the fingertips; the testicles have descended into the scrotum, and the labia majora are in apposition; the hair on the scalp is 1 to 2 inches long; the vernix caseosa is found chiefly on the back and flexor surfaces of the joints. The child cries lustily and nurses vigorously; in the course of a few hours it passes urine and meconium.

PHYSIOLOGY OF THE FŒTUS.

What are the functions of the fœtus?

Nutrition, circulation, respiration, secretion, and innervation.

How are the embryo and fœtus nourished?

During the passage of the impregnated ovum through the oviduct it is nourished first by the discus proligerus, and later by an albuminous substance or a "special liquid" derived from the mucous membrane of the oviduct. After it reaches the uterus it receives nourishment from the villi of the chorion and a liquid secretion from the uterine mucous membrane; later from the umbilical vesicle, the nutritive materials of which are carried to the embryo through the omphalo-mesenteric veins. After the formation of the allantois the umbilical vesicle atrophies, and the villi of the chorion, especially those in relation with the placental decidua, furnish its nutritive supply; the liquor amnii also adding a small amount of nourishment. Finally the placenta is the chief source of nourishment.

Describe the different circulations of intra-uterine life. See fig. 14.

First. The vitelline, blastodermic, or umbilical circulation.

This circulation depends upon the umbilical vesicle. The heart, at this period of embryonic life, consists of a single cavity. At its upper end are given off the first aortic arches; at its lower, the omphalo-mesenteric veins. The blood propelled from the heart passes into the body of the embryo through the aortic arches, and is then distributed to the vascular area of the umbilical vesicle by the omphalo-mesenteric arteries; from the venous sinus of the area it is returned to the heart by the omphalo-mesenteric veins.

Second. The fœtal, allantoid, or placental circulation.

To understand this subject properly it is necessary to study the structures peculiar to the circulatory apparatus of the fœtus, viz., 1st, the ductus venosus, connecting the umbilical vein with the inferior vena cava; 2d, the Eustachian valve, placed at the entrance of the inferior vena cava into the right auricle; it turns the blood into the foramen ovale; 3d, the foramen ovale, a large opening in the septum between the auricles; and, 4th, the ductus arteriosus, connecting the pulmonary artery with the aorta; it enters the latter somewhat below the point at which the arteries of the head and upper extremities are given off.

The blood from the placenta, rich with nutritive material and oxygen, is carried to the fœtus by the umbilical vein; after entering at the umbilicus the blood is divided into two currents. The larger current passes into the inferior vena cava through the ductus venosus, while the smaller one entering the liver is carried to the vena cava by the hepatic veins. The blood in the inferior cava, composed chiefly of pure blood from the placenta, goes to the right auricle, but the Eustachian valve turns the current through the foramen ovale into the left auricle, from which it passes into the left ventricle. The blood from the head and upper extremities passes into the right auricle through the superior vena cava, from which it enters the right ventricle.

The heart contracting sends the blood from the left ventricle into the aorta, and from the right ventricle into the pulmonary artery. The blood from the left ventricle supplies the head and upper extremities; that which enters the pulmonary artery from the right ventricle passes into the aorta through the ductus arteriosus, somewhat below the point at which the arteries of the head and upper extremities are given off. The impure blood from the

right ventricle after entering the aorta supplies the trunk, lower extremities, and placenta; passing from the aorta into the internal iliacs, it enters the hypogastric arteries and thus is returned to the placenta.

What organ receives the purest blood?

The liver.

What changes take place in the circulatory apparatus after birth?

1. The ductus arteriosus begins immediately to contract after respiration is established, and is completely closed in from two to ten days; it degenerates into a cord connecting the left pulmonary artery to the arch of the aorta.

2. The foramen ovale is closed by the tenth day; occasionally it remains permanently open, giving rise to a condition known as *cyanosis neonatorum*.

3. A portion of the hypogastric arteries remain pervious and are known as the superior vesical arteries.

4. The umbilical veins and ductus venosus are obliterated in from two to five days; the former becoming the round ligament of the liver.

What is the respiratory organ of the fœtus?

The placenta.

What are the proofs of this?

1. The abundance of hæmoglobin found in the blood.

2. The difference in color of the blood in the umbilical vein and arteries.

3. The temporary interruption in the placental circulation causes the blood in the umbilical vein to become dark.

4. Complete and permanent arrest of the placental circulation causes death by asphyxia.

5. Pulmonary respiration is the only substitute for placental.

6. Oxygen has been found in the fœtal blood by spectroscopic examination.

Describe the secretory organs of the fœtus?

1. The skin. The sebaceous glands begin to develop a short time before the fifth month, and their secretion is seen about two weeks later; it becomes abundant during the sixth month. The vernix caseosa, seen during the latter part of the fifth month, is composed largely of epidermic scales and fat globules; sebaceous matter also enters into its formation. The vernix caseosa prevents osmosis from the fœtal bloodvessels. The sudoriparous glands, developing later than the sebaceous, do not secrete during fœtal life.

2. The serous membranes. Hydrocephalus, hydrothorax, and ascites prove that these membranes secrete during intra-uterine life.

3. The intestinal mucous membrane, liver, and pancreas. The liver is developed about the fifth month, and forms bile, which passes into the small and large intestines. Meconium is a tenacious, odorless, greenish, or black substance, consisting of the secretions of the liver, pancreas, and intestinal mucous membrane; it may also contain materials derived from the liquor amnii.

4. The kidneys. These organs secrete during the latter half of intra-uterine life, and it is probable that the fœtus voids its urine into the liquor amnii.

What is known as to the movements and sensations of the fœtus?

The movements of the fœtus are recognized by the mother at about four months and a half. It probably moves its upper and lower extremities as early as the sixteenth or even the twelfth week. As to whether fœtal movements are reflex or voluntary is still a question of doubt.

It is impossible for the fœtus to see, hear, or smell. Taste is the earliest sense developed, and has been shown to exist in a child born at seven months.

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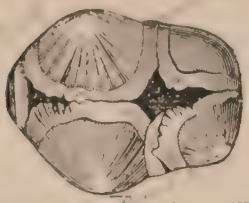
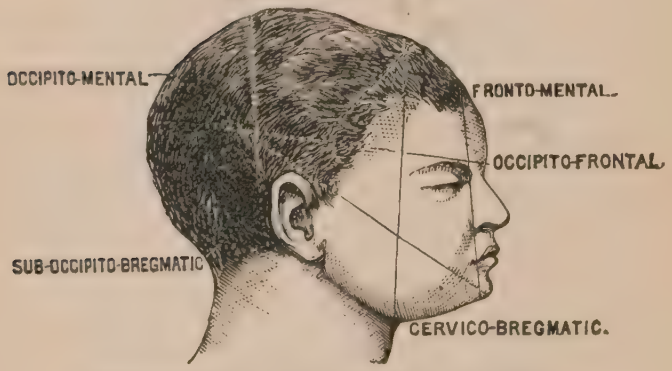
Fig. 15.



Fœtal head, as seen from above. (Hodge.)

Fig. 16.



Anterior-posterior and vertical diameters of the fœtal head.
(Tarnier et Chantreuil.)

Fig. 17.

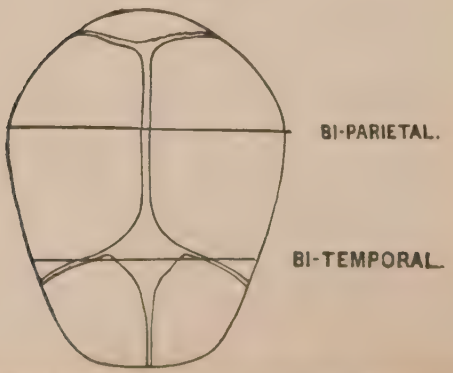


Diagram showing transverse diameters of fœtal head. (Tarnier et Chantreuil.)

The Fœtal Head and Trunk.

The Fœtal Head.

How is the fœtal head divided?

Into the face and cranium.

How is the cranium divided?

Into the vault and base of the skull; the former is compressible, while the latter is incompressible.

What are the peculiarities of the bones of the cranium?

1. They are loosely united by membrane or cartilage.
2. They are flexible on account of incomplete ossification.
3. The mobility of the squamous portion of the occipital bone, which is united to the basilar portion by cartilage.

Name the sutures of the fœtal head. See fig. 15.

The sagittal, fronto-parietal, and occipito-parietal.

The sagittal suture extends from the root of the nose to the superior angle of the occipital bone; that portion situated between the two frontal bones is often spoken of as the frontal suture.

The fronto-parietal separates the frontal and parietal bones; it is also called the coronal suture.

The occipito-parietal, or lambdoidal suture is placed between the occipital and parietal bones.

What are the fontanelles? See fig. 15.

Membranous spaces formed by the intersection of the sutures.

Name them.

The anterior and the posterior fontanelles. The former is also called the bregma; it is large and quadrangular in shape, and is formed by the intersection of the sagittal and fronto-parietal sutures; it is easily recognized in labor. The latter is triangular in shape, and is formed by the junction of the sagittal with the occipito-parietal suture. It is obliterated in labor by the over-riding of the bones.

How are the diameters of the fœtal head classified?

Into the antero-posterior; the transverse; and the vertical diameters.

Name them. See figs. 16 and 17.

The antero-posterior are: the maximum; the occipito-mental; the occipito-frontal; and the suboccipito-bregmatic.

The transverse are: the biparietal; bitemporal; and the bimastoid.

The vertical are: the fronto-mental and the trachelo- or cervico- or laryngo-bregmatic.

Between what two points are the diameters taken and what do they measure?

Maximum, from the chin to a point in the sagittal suture midway between the two fontanelles.

Occipito-mental, from the superior angle of the occiput to the chin.

Occipito-frontal, from the superior angle of the occiput to the root of the nose.

Sub-occipito-bregmatic, from the union of the occiput with the neck to the middle of the bregma.

Biparietal, between the parietal bosses.

Bitemporal, between the extremities of the fronto-parietal suture.

Bimastoid, between the mastoid processes.

Fronto-mental, between the top of the forehead and the chin.

Trachelo-bregmatic, from the middle of the bregma to the neck near the larynx.

Maximum, 13½ cm. (5¼ in.).
Occipito-mental, 13½ cm. (5¼ in.).
Occipito-frontal, 11¾ cm. (4¼ in.).
Suboccipito-bregmatic, 9½ cm. (3¾ in.).
Biparietal, 9½ cm. (3¾ in.).
Bitemporal, 8 cm. (3.15 in.).
Bimastoid, 7½ cm. (3 in.).
Fronto-mental, 8 cm. (3.15 in.).
Trachelo-bregmatic, 9½ cm. (3¾ in.).

What does the great circumference of the fœtal head measure?

34½ cm. (13½ in.).

What does the small circumference measure?

31½ cm. (about 12⅜ in.).

What alteration of diameters occurs during labor?

In presentations of the vertex:

1. Lessening of the O.-M. and O.-F. diameters.
2. Lessening of the Sub-O.-B. and B.-T. diameters.
3. Slight lessening of the B.-P. diameter.
4. Increase of the M. diameter.
5. The B.-M., diameter remains unaltered.

In presentations of the breech:

There is little or no alteration of diameters.

In presentation of the face:

1. Increase of the O.-M. and O.-F. diameters.
2. Lessening of the F.-M. and T.-B. diameters.

What do you mean by flexion of the head?

A bending forward, the chin resting upon the chest.

What do you mean by extension of the head?

A bending backward, the occiput coming in contact with the back of the fœtus.

Does an extensive rotation of the head from side injure the cord or the ligaments?

No. The face may be turned almost directly posterior without any injury resulting; the larynx, however, may be injured.

The Fœtal Trunk.

What are the diameters of the trunk?

The bis-acromial, the dorso-sternal, the bis-trochanteric, and the sacro-pubic.

What do they measure?

Bis-acromial, 12 cm. (4.7 in.); it can be compressed 2½ cm. (1 in.).

Dorso-sternal, 9½ cm. (3.7 in.).

Bis-trochanteric, 8¾ cm. (about 3.5 in.).

Sacro-pubic, 2 inches; increased to 4 inches by the flexion of the legs and thighs upon the abdomen.

All of the diameters can be more or less compressed.

The Attitude and Presentation of the Fœtus.

What is meant by the attitude of the fœtus? See fig. 18.

"The general form and direction of the trunk, and the position of the limbs with reference to it" (Parvin).

What are the causes of its attitude?

1. The continuance of its embryonic form; its first distinct shape being that of a curve.

2. Pajot's law of accommodation: "When a solid body is contained in another, if the container is the seat of alternate movement and rest, if the surfaces are slippery and little angular, the content constantly tends to accommodate its form and dimensions to the form and capacity of the container."

What is meant by the presentation of the fœtus?

"That part of the fœtus which is in relation with the pelvic inlet" (Parvin).

"That portion of the fœtus which occupies the lower segment of the uterus" (Lusk).

Does the fœtus change its position in utero?

Yes. Especially in multiparæ; it is common to find transverse presentations changing into normal ones, but rare for breech to change into head presentations.

PUBERTY, NUBILITY, OVULATION, MENSTRUATION, AND MENOPAUSE.

What is puberty?

"Puberty is that epoch in human life when the individual first becomes capable of reproduction" (Parvin).

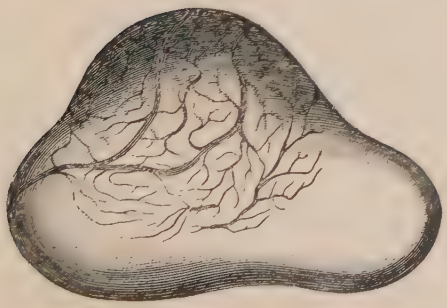
At what age does it occur?

It occurs earlier in warm countries, later in cold climates. In

FIG. 18.

First cranial position.

FIG. 19.



Ovary with ripe ovisac.

temperate climates it usually occurs between the fourteenth and sixteenth years, in the largest number of girls occurring in the fifteenth year. It may occur as early as the tenth or eleventh year, or not until the eighteenth or twentieth.

What changes occur in the female at puberty?

The breasts enlarge, the pelvis widens, hair appears on the mons veneris and labia majora, the body fills out, and the character changes. Two functions are now established, viz., ovulation and menstruation.

What is nubility?

The period of fitness for reproduction.

How old should a woman be to bear children?

Twenty years.

What is ovulation?

"The maturing and rupture of ovisacs, with the subsequent escape of ovules" (Parvin).

Is ovulation periodical?

No.

Is the discharge of an ovule periodical?

Yes, in all probability.

Does ovulation occur during pregnancy and lactation?

No; it may, however, occur in rare cases.

What changes take place in the ovary at the time of puberty? See fig. 19.

A number of the ovisacs begin to mature, and one of them, more developed than the rest, projects from the surface of the ovary; becoming greatly distended, it ruptures and the ovule escapes. The development of the ovisacs causes a congestion, and an increase in the vascular tension of the ovary.

What are the causes of rupture of the ovisac?

1. An increase of its contents, due either to the breaking down of the membrana granulosa, or to a fluid secreted by it.

2. A hemorrhage into the ovisac.

3. Fatty degeneration of the wall of the ovisac.
4. Contraction of the coat of the ovisac.
5. Contraction of the muscular fibres of the ovary.

How is the ovule carried through the oviduct?

1. By the movements of the ciliæ.
2. By the peristaltic contractions of the oviducts.

What changes occur in the non-impregnated ovum?

The throwing off of polar cells, or globules.

Describe this process.

The germinal vesicle moves from the centre to the periphery of the ovule, and a portion projecting beyond it becomes constricted and is thrown off; this is repeated several times.

What is the corpus luteum?

The corpus luteum, or yellow body, is the result of certain changes which take place in the ovisac subsequent to its rupture and the escape of its contents.

How is the corpus luteum formed?

The edges of the tear in the wall of the ovisac become glued together by an exudation. The internal layer of the ovisac becomes hypertrophied, while the external layer contracts, thus throwing the former into folds, which, eventually coming in contact, unite and obliterate the sac. The hypertrophy of the inner layer is due to the development of cells; the granules which they contain multiply and are converted into globules.

How are the corpora lutea divided?

1. Corpora lutea of menstruation.
2. Corpora lutea of pregnancy.

What is the history of the corpus luteum of menstruation?

It reaches its greatest size in from ten to thirty days, and then takes on atrophy; by eight or nine weeks nothing remains but a cicatrix.

What is the history of the corpus luteum of pregnancy?

It reaches its greatest size in from thirty to forty days, and

remains without any change until the beginning of the fifth month, when it slowly decreases in size until the end of pregnancy, at which time it is two-thirds its largest dimensions; one month after labor it is obliterated.

What is the value of the corpus luteum of pregnancy as a sign of conception?

Of very little value, as its characteristics are not constant.

How is the ovule carried to the oviduct?

It is directed along the groove of the tubo-ovarian ligament by the ciliæ and also by the current produced by the ciliæ of the ampulla.

Some authorities teach that the fimbriated extremity of the oviduct grasps the ovary, and that the ovule is shot, as it were, into its proper course; this is not generally accepted.

What surrounds the ovule as it escapes from the ovisac?

The discus proligerus; an accumulation of the cells forming the membrana granulosa.

What is meant by external migration of the ovule?

The entrance of the ovule into the oviduct of the opposite side from the ovary from which it escaped.

How is this explained?

By the current produced by the ciliæ being stronger on the opposite side; in some cases by an occlusion of the tube on the same side. The ovum passes over behind the womb.

What is menstruation?

"A temporary and intermittent function of the female organism; it has for its most obvious phenomenon a discharge of blood from the genital canal." (Parvin.)

How are the phenomena of menstruation divided?

1. General phenomena.
2. Local phenomena.

What are the general phenomena?

Chilliness; flashes of heat; pain in different parts of the body;

and, in some cases, hysteria. Some women are sleepy, and but few care for active exercise. Among other symptoms which may be noted as occurring in some cases, are diarrhœa, irritability of the bladder, a dark circle under the eyes, swelling and painful sensations in the breasts, and a sense of fulness in the head.

What are the local phenomena?

The changes in the ovary have already been described; they consist in the enlargement and congestion of the organ and the rupturing of an ovisac. The uterus becomes greatly congested and increased in size; the cervix becomes softer and violet-colored, and the external os and internal os are open. The mucous membrane of the cavity is greatly congested and swollen; it becomes folded, and the surface presents an irregular appearance. The glands secrete abundantly. The epithelium loosens and is detached; the capillaries, no longer supported, rupture, and the blood escapes. The oviducts become congested, their walls thicken, and blood sometimes escapes into them. The vagina becomes of a violet color, its secretion more abundant, and its temperature slightly elevated. The external organs are swollen, and occasionally there is a pruritus.

What is the source of the hemorrhage?

From the mucous membrane of the cavity of the uterus, and also probably from the oviducts.

Is the entire mucous membrane of the uterus thrown off during menstruation?

Williams believes that the mucous membrane is entirely removed down to the muscular fibres; Kundrat and Engelmann hold that only the superficial layer is thrown off; and Môricke claims that none is shed at a menstrual period.

What causes rupture of the capillaries?

1. Great distention.

2. Fatty degeneration, with removal of the superficial epithelium of the uterine cavity.

What is the character of the flow?

At first it is pale, consisting chiefly of mucus, with a slight

amount of blood; later it becomes bright red, and, finally, at the close of menstruation it lessens in quantity, and becomes pale again. The discharge is non-coagulable. This is due to its admixture with the glandular secretions, and also on account of being defibrinated. It has a peculiar odor, and is alkaline in reaction; the odor is probably due to retention, or to admixture with the secretions.

What is the quantity of the flow?

From four to six ounces.

What is the duration of the flow?

Generally from three to four days.

How often does the flow recur?

Every lunar month, or twenty-eight days.

Is it necessary for every healthy woman to follow a certain average as to the quantity, duration, or recurrence of the flow?

No; "every woman is a law unto herself." Cases are on record of women who were in perfect health, menstruating every forty-eight days; again, two cases where the flow occurred only two or three times a year; this cannot be called normal, however.

What causes influence the first appearance of menstruation?

1. Climate.
2. Race.
3. Residence.
4. Heredity.
5. Genital sense.

What is the genital sense?

"The greater or less vigor shown in the development of ovisacs;" the sexual desire.

Does menstruation occur during pregnancy and lactation?

No; except in rare cases.

What is the connection between ovulation and menstruation?

Ovulation is independent of menstruation, but menstruation is dependent upon ovulation—*i. e.*, the development of many ovisacs, not the periodical rupture of one.

The reflex irritation caused by ovulation produces congestion of the organs of generation, which, continuing, is relieved by menstruation. Thus we have a condition of plethora followed by that of anæmia; ovarian irritation continuing, hyperæmia again takes place, to be relieved later on by menstruation.

What is the menopause?

"The end of menstrual life."

When does it occur?

There is no definite time; in the majority of cases from forty-five to fifty years of age.

What effect has the time of puberty upon the appearance of the menopause?

If puberty comes on early the menopause usually appears late, while delayed puberty indicates an early end of menstrual life.

What are some of the symptoms at the time of the menopause?

The menstrual flow does not stop suddenly, but becoming irregular, and after a time ceasing, it begins again after several months, and finally ceases altogether. At this time there are apt to be congestions of the head, lungs, and especially of the liver; the breasts and abdomen may enlarge, and the woman imagines herself pregnant. Later, atrophy of the external and internal organs of generation takes place, and the woman loses, as it were, her sex.

Can pregnancy occur after the menopause?

Yes; as ovulation may continue, in some cases, for several months or years.

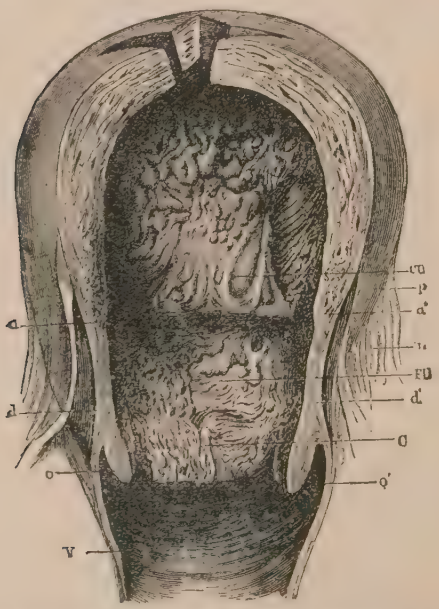
Can pregnancy occur prior to menstruation?

Yes; as ovulation may begin, in some cases, before the appearance of the menstrual flow.

FIG. 20.

Spermatozoa from the human subject (magnified eight hundred diameters). (Luschka.)

FIG. 21.



Uterus of a multipara at term.—*a*, *a'*, Braune's orifice; *d*, *d'*, Muller's ring; *o*, *o'*, external os; *FU*, lower segment of womb; *L*, broad ligament; *C*, mucosa of the cervix; *cu'*, body of uterus; *p*, peritoneum.

PREGNANCY.

Conception.

What is conception?

"The union of two living elements; one male, the other female" (Parvin).

What are the synonyms for conception?

Impregnation, fecundation, and incarnation.

How is pregnancy divided?

1. Simple, or single pregnancy.
2. Multiple pregnancy.
3. Abnormal or extra-uterine pregnancy.

What are the fecundating elements in the semen? Fig. 20.

The spermatozoids.

What is their length?

From $\frac{1}{500}$th to $\frac{1}{625}$th of an inch.

Have they the power of movement?

Yes; they propel themselves by rapid movements of their tails. Spermatozoids pass from the orifice of the vagina to the cervix in three hours.

How long do they retain their vitality?

Exposed to the air, they cease their movements in twenty-four hours; in a closed vessel they move for fifty to sixty hours; and in the human female they have been found alive eight days after sexual intercourse.

What agents destroy their vitality?

Placed under a high temperature their movements cease, but return again when the temperature is reduced to 98.4° F. They are destroyed by electricity, alcohol, acids, concentrated alkaline solutions, and mercuric chlorid, 1 to 10,000; cold also retards their movements.

What agents increase their vitality?

Warmth, weak alkaline solutions, the glandular secretions of the uterus, and the menstrual fluid.

Where does fecundation occur?

"In the oviduct, probabably near or in the pavilion."

How is the ascent of the spermatozoids effected?

During coition the semen is deposited in the vagina, and the spermatozoids by their own power of motion enter the cervical canal. Their ascent along the cervical canal and through the cavity of the uterus, is caused by their own movements and that of the ciliæ of the epithelium. Their passage along the oviduct is effected by their own movements, aided by capillary attraction.

How long after coition before the spermatozoids begin to enter the os uteri?

In from 25 to 30 minutes.

How long a time intervenes between coition and fecundation?

In all cases some hours, or it may be several days.

How may spermatozoids enter the ovule?

Only one spermatozoid enters the ovule in normal fecundation. According to Newport and others, however, several enter and mingle with the yelk.

At what time is coition most likely to be followed by fecundation?

During the first seven days after the menstrual flow ceases; the first day following menstruation being the most likely time.

Do the spermatozoids not concerned in fecundation have any influence upon future pregnancies?

There are no positive proofs in answer to this question. It is supposed, however, that they modify in some way the ovules contained in the ovaries; this is spoken of as "infection" of the mother.

Changes in the Maternal Organism.

What changes take place in the blood and circulatory apparatus?

1. Blood: The quantity is increased after the fourth month. The following changes occur in quality, viz., the water and white globules increase, and the red globules, iron, and albumen decrease; the fibrin decreases up to the sixth month, and then increases until the end of pregnancy.

2. Heart: Hypertrophy of the left ventricle occurs, which disappears after pregnancy is at an end. There are increased arterial tension and fulness of the veins.

What changes occur in the skin?

1. Pigment deposits: These may occur upon the face, the mammary glands, the external genitals, and the abdominal wall. Upon the abdominal wall a line of pigment deposit is usually seen in the median line, extending from the mons veneris to the umbilicus; in some cases it extends to the xiphoid cartilage (*linea nigra*).

2. Striæ: The cicatrices of pregnancy become distinct about the seventh month. They are usually found upon the abdomen, but in some cases also upon the thighs, hips, and mammary glands. They are reddish or bluish in color, and after pregnancy become white and look like old scars (*linea albicantes*).

What changes occur in the umbilicus?

It is usually depressed for the first two or three months of pregnancy; at the sixth month it is on a level with the surrounding skin; from then, on to the end of pregnancy, there is more or less protrusion.

What changes occur in the external genitals and the vagina?

Appreciable changes do not occur in these organs until about the fourth month. The external genitals become more moist; the labia majora and minora larger, more open and resisting; and pigment-deposits take place. The urinary meatus becomes red and prominent, and the mucous membrane of the vulvar canal assumes

a dark-red color. The vagina increases in length about the fourth month, and becomes shorter again at the end of pregnancy, from the descent of the uterus and the process of labor. It becomes a violet-red color (*Jacquemin's sign*), and its papillæ are enlarged; its secretions also become more abundant. The muscular tissue of the vagina hypertrophies, and a greater supply of blood being sent to it causes a distinct pulsation of the vaginal arteries—Osiander's sign of pregnancy.

What changes occur in the uterus? See fig. 21.

1. Uterine walls:

a. Serous coat: The peritoneal covering becomes thickened.

b. Muscular coat: The muscular fibres increase greatly in size, and "embryonic muscle cells" develop into fully formed muscular tissue.

c. Mucous coat: The changes in the mucous membrane have already been described.

2. Uterine vessels:

a. Arteries: They increase not only in volume and length, but also in number; they remain tortuous during the whole period of pregnancy. The arteries suddenly enlarge as they enter the uterus and are placed nearer to the peritoneal than to the mucous surface, except at the site of the placenta.

c. Veins: They grow to a very large size. In the walls of the uterus they form sinuses, which intercommunicate. All of the veins are without valves. Some have only a single coat (the intima), which is closely attached to the muscular tissue of the uterus. The venous sinuses are very numerous near the placenta.

3. Size: At the end of pregnancy the uterus measures, in its vertical diameter, 13.6 inches; in its transverse, 9.36 inches; and in its antero-posterior, 8.9 inches (Cazeaux). At the end of pregnancy the uterus weighs from 20 to 24 times as much as in the virgin.

4. Form: At first the uterus is triangular in form, later it becomes pyriform, then spheroidal, and in the last three months of pregnancy it is ovoidal.

5. Position: During the first few weeks of pregnancy the uterus is lower in the pelvis. About the middle of the third or the be-

ginning of the fourth month the fundus is above the brim of the inlet. Toward the end of the fourth month it is about 2 inches above the pubes. About the fifth month it causes a decided projection of the hypogastric region. At the sixth month it is on a level with the umbilicus, at the seventh month two inches above, and toward the end of the ninth month it is just below the xiphoid cartilage. In the multigravida the fundus does not reach as high as in the primigravida, owing to the relaxation of the abdominal walls in the former allowing it to project forward. Usually the uterus sinks into the pelvic cavity one to four weeks before labor. This is caused by the resistance of the abdominal and uterine walls. The position of the uterus is not directly in the median line, but there is a right lateral obliquity, due to the presence of the rectum on the left side; in addition to this obliquity there is also a left lateral rotation, which is dependent upon its embryonic development.

6. Consistency of the walls: As the uterus increases in size its walls become soft and elastic; this alteration in consistency assists in the accommodation of the fœtus and prevents abnormal presentations and positions.

7. Properties of the uterus: Pregnancy does not create any new property of the uterus, but simply increases those properties which are obscure or latent.

a. Contractility: This property is due to the muscular structure of the uterus. It is an alternate shortening and lengthening of its muscular fibres. Upon this property of the uterus depend the painless contractions which occur during pregnancy.

b. Retractility: "This is that property of uterine tissue by virtue of which the uterus, emptied of a part of its contents, acquires a greater thickness of its walls, while the volume and capacity diminish." In other words, it is simply a permanent shortening of the muscular fibres of the uterus. By virtue of this property the uterine walls are kept in direct contact with the fœtus, vessels are closed after the separation of the placenta, and the uterus is held in the condition it assumes after labor.

c. Irritability, elasticity, sensibility: All of these properties are more or less increased during gestation.

8. Cervix:

a. Softening: This process begins early in pregnancy. In the primigravida it advances slowly, but in the multigravida it is more rapid. In the latter the softening of the vaginal cervix advances as follows, viz.: "One fourth is affected by it at four months, one-half at six, three-fourths at seven, and the remaining fourth at eight months." This process always begins around the external os.

b. Shortening: This process begins in the last two weeks of pregnancy; in some cases not until a few hours before labor. After the cervix is completely obliterated pregnancy is ended and labor begins.

c. Orifices and cavity:

Primipara: The external os uteri becomes round instead of a transverse slit. It is closed until the end of pregnancy, unless there have been repeated examinations made or threatened abortion has occurred. The cervical cavity is widened, but the internal os remains closed until the cervix is obliterated.

Multipara: The external os uteri is round, and hard projecting nodules are felt along its borders, which are the result of lacerations in former labors. The internal os is readily touched by the examining finger, but it remains closed until labor; in some cases, however, the finger may touch the membranes during the last few weeks of pregnancy. The cavity of the cervix is funnel-shaped.

What changes occur in the uterine appendages?

1. Broad ligaments: They undergo hypertrophy and assume a vertical position.

2. Round ligaments: They become greatly hypertrophied. On account of the great development of the posterior wall of the uterus, they are not inserted upon the sides, but at the "union of the posterior four-fifths and the anterior-one-fifth of its lateral surfaces."

3. Ovaries: These organs increase in size and assume a vertical position. Ovulation ceases, and the corpus luteum undergoes certain changes, which have been already described.

4. Oviducts: They become hypertrophied, and their epithelium loses its ciliæ. A yellowish-white viscid liquid, containing epi-

thelium and fatty granulations without leucocytes, has been found in the oviducts during pregnancy.

Describe the changes occurring in the mammary glands.

The mammary glands begin to enlarge early, about the beginning of the second month. At the same time there occurs a tingling sensation in them and they become more sensitive. The superficial veins become swollen, and if the breasts undergo considerable enlargement striæ appear about the fifth or sixth month. About the second or third month the nipples become pigmented, enlarged, and sensitive. During the last three months colostrum can usually be squeezed from the nipples. The areola becomes pigmented, enlarged, and swollen about the second month. The glands of Montgomery, ten or twelve in number, become enlarged; they are considered to be rudimentary mammary glands. The secondary areola appears about the fifth or sixth month. It has a mottled appearance, and in the centre of each white spot is seen a small black point, which is a hair-follicle.

Signs and Diagnosis of Pregnancy.

How are the signs of pregnancy classified?

1st, the subjective signs, or those that the patient tells us; 2d, the objective signs, or those which we can ascertain by our various senses.

What are the subjective signs?

1. Absence of menstruation.
2. Nausea and vomiting.
3. Salivation.
4. Nervous disorders.
5. Enlargement and tingling sensations in the breast.
6. Irritability of the bladder.
7. Leucorrhœa.
8. Quickening.

What is the value of the various subjective signs?

Absence of menstruation: This sign is of great value in a woman hitherto regular. It must be remembered that conception has oc-

curred prior to the first appearance of the menses, after the meno pause, and also during lactation. The amenorrhœa may be due in some cases to a pathological condition. In rare cases menstruation only occurs during pregnancy. Finally, mental impressions may cause menstruation to cease for one or two periods.

Nausea and vomiting: This is a very common symptom of pregnancy, usually beginning at the first menstrual suppression; it is known as the "morning sickness." It is of great value as a sign, if associated with amenorrhœa, and if it occurs at regular times, and immediately upon taking food, the appetite being but little interfered with.

Salivation: An excessive secretion from the salivary glands is uncommon; it generally accompanies hyperemesis. "Cotton spitting" is the popular term for this sign.

Nervous disorders: These symptoms are of but little value. They are generally indicated by some form of mental disturbance, or a change in the disposition.

Enlargement and tingling sensations in the breasts: These symptoms are present in most women soon after conception. They are of but little value, as they may occur in the non-pregnant. These symptoms may also occur, in some cases, during menstruation.

Irritability of the bladder: This is a sign of no value. It usually occurs early in pregnancy.

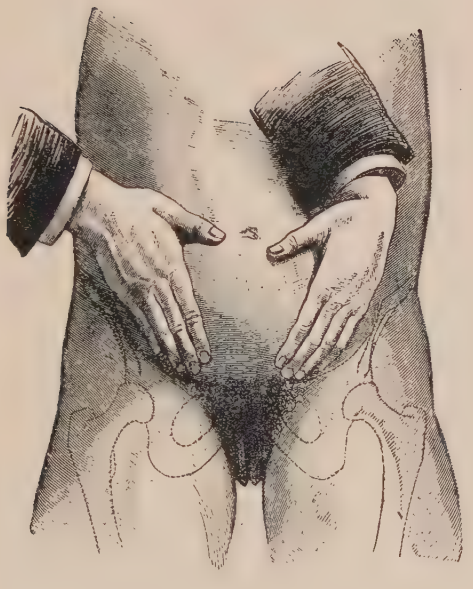
Leucorrhœa: A discharge of mucus from the vagina is of no value as a sign of pregnancy, as it is common in the non-pregnant.

Quickening: Fœtal movements are first recognized by the mother, in most cases, at four and a half months. Women may, in rare cases, feel life as early as the twelfth week; in some cases the fœtal movements are absent throughout pregnancy. Flatus in the intestines or contractions of the abdominal muscles may be mistaken for fœtal movements. In some cases, women who are not pregnant assert that they feel fœtal movements, really believing the statement themselves.

How are the objective signs determined?

By inspection, touch, and auscultation.

FIG. 22.



Position of hands at the beginning of abdominal exploration. (Pinard.)

How is pregnancy diagnosed by inspection?

By examining:

1st. The face of the patient.

2d. The prominence of the abdomen, the curve of the spinal column, and the position of the shoulders, the woman being erect.

3d. The abdomen.

4th. The external genital organs and the vagina.

5th. The breasts.

6th. The urine for kyestin; this sign is of no value.

7th. The pulse; it remains the same whether erect, sitting, or lying down—Jorissenne's sign; it is of no value.

The changes occurring during pregnancy in the skin of the abdomen, in the breasts, the external genitals, and the vagina, have already been described.

What is the obstetrical definition of "touch"?

"A digital or manual examination of the female internal and external generative organs and adjacent parts for diagnostic or therapeutic purposes" (Parvin).

How is touch divided?

Into: 1, vaginal; 2, abdominal; 3, rectal; 4, vesical.

Abdominal touch may be combined with either vaginal or rectal; it is then known as bimanual touch.

Define abdominal touch? See fig. 22.

"The application of the hands to the abdomen for the diagnosis of pregnancy and its duration, to ascertain whether it be single or multiple, the presentation and position of the fœtus, and for the correction of an unfavorable presentation" (Parvin).

What signs of pregnancy are determined by touch?

1. Changes in the vagina.
2. Changes in the cervix and os uteri.
3. Hegar's sign.
4. Ballottement.
5. Size and shape of the uterus.
6. Intermittent contractions of the uterus.
7. Uterine fluctuation.

8. Recognition of the fœtus.
9. Movements of the fœtus.

Describe these signs.

The changes occurring in the vagina, the cervix, and os uteri, have already been described.

Hegar's sign.—This is a softening of the lower segment of the uterus above the utero-sacral ligaments. The examination is made by the abdomino-rectal touch. Hegar considers this a certain sign.

Ballottement, or re-percussion:

Varieties.—Internal (vaginal), or external (abdominal).

Methods.—Vaginal. The woman either stands or lies down. In the former position, the finger is placed in the anterior cul-de-sac; in the latter, in the posterior cul-de-sac. The finger is given a sudden upward movement, while the free hand is placed externally over the fundus of the uterus.

Abdominal. Place the woman on her back, and apply the hands on either side of the uterus, and then displace the fœtus from one side to the other, or place the patient on her side, so that the abdomen hangs over the edge of the bed, and include the uterus between the two hands, one placed above, the other below, then make a sudden upward movement with the lower hand.

Value.—An almost certain sign. Multiple pregnancy, hydramnios, oligohydramnios, placenta prævia, or abnormal presentations, may prevent ballottement.

Differential diagnosis.—Calculus of the bladder, sharp anteflexion of the uterus, pedunculated subperitoneal fibroid, and multilocular ovarian cyst.

Time.—Recognized at about five months; complete displacement six to seven months; abdominal at six months.

Size and shape of the uterus.

By abdomino-vaginal touch the tumor will be found to be continuous with the cervix, and the body of the uterus expanded and elastic.

The size of the uterus in the successive months of pregnancy has already been described.

Intermittent contractions of the uterus (*Braxton Hicks's sign*):

Time.—At the end of the third month.

Method.—Place the hand on the abdomen with sufficient pressure to bring it into contact with the uterus. The contractions occur every ten or fifteen minutes, and last from one to two.

Differential diagnosis.—Distended bladder and soft uterine fibroids.

Uterine fluctuation:

Time.—Second month.

Method.—Introduce two fingers into the anterior cul-de-sac, and make counter-pressure above the pubes.

Value.—Associated with amenorrhœa and changes in the areola, it is a certain sign (Dr. Rasch.)

Recognition of the fœtus:

Time.—At five months; different parts of the fœtus at the end of the sixth or beginning of the seventh month.

Value.—Certain sign.

Movements of the fœtus:

Time.—The last of the fifth or beginning of the sixth month.

Varieties.—General and partial. In the former the entire fœtus moves, causing a change in the shape of the uterus; in the latter, the head or extremities only, giving the sensation of sudden taps.

Value.—Certain sign. A feeble child or hydramnios may cause them to be absent.

Differential diagnosis.—Contractions of the abdominal muscles, and gas in the intestines.

What signs of pregnancy are determined by auscultation?

1. Fœtal heart sounds.
2. Uterine souffle.
3. Cardiac souffle.
4. Funic souffle.
5. Fœtal shock.

Describe these signs.

Fœtal heart sounds:

Description.—They sound like the tic-tac of a watch heard through a pillow.

Time.—Generally at five months; rarely at three, less rarely at three and a half months; heard by all experts at four months.

Situation of stethoscope.—Up to the end of four months it should

be placed over the fundus of the uterus; after that period the situation of the stethoscope depends upon the presentation and position of the fœtus.

Frequency.—From 120 to 160 per minute; the average being 140.

Relation of frequency to sex.—134 per minute is taken as the dividing line; "above which the sex will be female, and below which the sex will be male." This is, of course, by no means a certainty.

Value.—Certain sign; the death of the fœtus, and other conditions, may cause the sounds to be absent or inaudible.

Causes influencing distinctness:

1. Size, and period of the development of the fœtus.
2. Position of the fœtus.
3. Amount of liquor amnii.
4. Thickness of abdominal and uterine walls.

Uterine souffle.

Origin.—Due to the passage of blood in the uterine arteries.

Description.—It is synchronous with the maternal pulse. It varies in quality and intensity, resembling somewhat the bruit of an aneurismal tumor; it is heard for several days after delivery.

Situation.—It is most frequently heard at the lower segment of the uterus; more distinct on the left than on the right side. At times, it may be heard over any portion of the uterus.

Time.—From four to five months.

Value.—It is of very little value as a sign of pregnancy. It is heard in uterine fibroids, in enlargements of the uterus from any cause, and in a few ovarian tumors.

Cardiac souffle.—Of no value as a sign. It is caused by the passage of blood through the foramen ovale.

Funic souffle.—Of no value as a sign. It is caused by pressure upon the umbilical cord, and indicates fœtal danger.

Fœtal shock.—Can be heard about the middle of pregnancy; the impression conveyed to the ear is that of a sudden tap, followed by a quick bruit.

What are the certain signs of pregnancy?

1. Fœtal heart sounds. 2. Fœtal movements. 3. The recognition of the fœtus.

Differential Diagnosis of Pregnancy.

What conditions may be mistaken for pregnancy?

Physometra, hydrometra, hæmatometra, uterine fibriods, ovarian tumors, ascites, fat in the belly wall, pseudo-cyesis, tympanitic distention of the intestines, phantom tumor, and congestive hypertrophy of the uterus.

What is the differential diagnosis between these conditions and pregnancy?

Fibroid Tumors.	*Pregnancy*
Uterus irregular in shape, hard and resisting.	Uterus regular in shape, elastic, and yielding.
Menstruation present, irregular and profuse.	Menstruation absent.
Very slow growth.	Rapid growth.
Subjective signs absent.	Subjective signs present.
Intermittent contractions of the uterus rare.	Intermittent contractions constant.
Uterine souffle present.	Uterine souffle present.
Dulness on percussion.	Dulness on percussion.
Other objective signs absent.	Other objective signs present.

Ovarian Tumor.	*Pregnancy.*
Begins on one side.	Begins in the median line.
Slow growth.	Rapid growth.
Tumor more or less to one side.	Tumor in the median line.
Deteriorated health.	Health normal.
Fluctuation more or less general.	No fluctuation, except in hydramnios, when it is confined to the upper part of the abdomen.
Menstruation present.	Menstruation absent.
Other subjective signs absent.	Other subjective signs present.
Objective signs absent.	Objective signs present. Braxton Hicks's sign of great importance.

Ascites.	*Pregnancy.*
Fluctuation general.	Fluctuation absent, except in hydramnios.
Percussion note: clear in the median line, dull at the flanks; note changes with position of patient.	Dull in the median line, clear at the flanks; no alteration in note with change in position.
Subjective signs absent.	Subjective signs present.
Objective signs absent.	Objective signs present.
Fat in the Belly Wall.	*Pregnancy.*
Usually occurs between 40 and 50 years of age.	Before the menopause.
Abdomen is pendulous.	Abdomen firm and prominent.
Fat may be included between the hands.	The amount of fat is usually not large.
Subjective signs absent	Subjective signs present.
Objective signs absent.	Objective signs present.
Physometra.	*Pregnancy.*
Small, and of slow growth.	Large, and of rapid growth.
Tympanitic on percussion.	Dull on percussion.
Subjective signs of pregnancy absent.	Subjective signs present.
Objective signs of pregnancy absent.	Objective signs present.
Hydrometra.	*Pregnancy.*
Usually occurs after menopause.	Occurs before menopause.
Small, and of slow growth.	Large, and of rapid growth.
Subjective signs absent.	Subjective signs present.
Objective signs absent.	Objective signs present.
Hæmatometra.	*Pregnancy.*
Atresia of genital canal.	No atresia.
Uterus hard and resisting.	Uterus elastic and yielding.
Periodical enlargement at menstrual period.	Gradual and progressive enlargement.
Enlargement associated with pain.	No pain.
Subjective signs absent.	Subjective signs present.
Objective signs absent.	Objective signs present.

Phantom tumors.—Percussion gives a clear note over the entire abdomen, and the subjective and objective signs are absent. The administration of an anæsthetic will cause the tumor to disappear.

Congestive hypertrophy of the uterus.—This disease may be mistaken for an early pregnancy, especially when associated with amenorrhœa. Time is the great element in the diagnosis; pain and tenderness of the uterus on pressure will also assist in preventing an error.

Pseudo-cyesis, false or spurious pregnancy.—This condition generally occurs about the time of the menopause in hysterical women and also in the unmarried who have subjected themselves to the risks of pregnancy. Very many of the subjective signs of pregnancy are present. The abdomen may enlarge, the breasts swell and secrete milk, supposed fœtal movements may be felt, menstruation may be absent, the stomach may be irritable, and at the end of the supposed pregnancy the patient may go into a spurious labor with all of the phenomena.

In making a diagnosis the subjective symptoms are of no value. The objective symptoms will at once clear up the case.

Tympanitic distention of the intestines.—A clear note on percussion over the entire abdomen, with an absence of all the subjective and objective signs, renders a mistake in diagnosis impossible.

What is the diagnosis between the first and subsequent pregnancies?

Primigravida.	*Multigravida.*
The abdomen is smooth and resisting; fresh striæ are seen.	The abdomen is relaxed and pendulous; old striæ are seen as well as fresh ones.
The breasts are firm and prominent.	The breasts are relaxed and hanging.
The uterus is firm and inclines but little forward.	The uterus is relaxed and inclines forward.
The cervix is conical and the os closed.	The cervix is club-shaped; the os open; there is a distinct anterior and posterior lip, the result of lacerations.

The vulva is closed and the posterior commissure is intact.	The vulva gaps and there is more or less laceration of the perineum.
The vagina is small and the rugæ distinct.	The vagina is large and the rugæ more or less indistinct.

What is the diagnosis of the death of the fœtus?

1. Failure, after repeated examinations, to recognize the fœtal heart sounds and fœtal movements.

2. The uterus ceases to grow and becomes flabby.

3. The breasts decrease in size and become soft.

4. The patient's health deteriorates; she suffers from chilly sensations and a feeling of weight in the hypogastrium.

5. If the head of the fœtus can be felt through the os uteri, the bones will be found to be loose and movable.

What is the duration of pregnancy?

Between insemination and labor two hundred and seventy-five days; between the end of menstruation and labor two hundred and eighty days or ten lunar months. It is impossible to know the exact duration of pregnancy, unless we can ascertain the precise moment of conception.

How is the date of confinement calculated?

"Count nine calendar months from the cessation of the flow, and add five days; or we may add five days to the date when the flow stopped and count back three months." Quickening is not to be depended upon in predicting the date of confinement; it may, however, in some cases assist in making the calculation.

What is meant by precocious births?

Births occurring before the usual time of viability; the children being born strong and continuing to live.

What is meant by prolonged pregnancy?

Pregnancy continued beyond the usual period; the fœtus being born alive. The law in this country recognizes as legitimate a pregnancy prolonged up to three hundred and seventeen days.

What is meant by missed labor?

Pregnancy continued beyond the usual period; the fœtus being dead. It usually occurs in abdominal fœtation.

Multiple Pregnancy.

What are the conditions necessary for multiple pregnancies?

The ovules must come from one or both ovaries, or two ovules in one ovisac; an ovule may contain two germs, or the germ may divide into two germs.

What is the frequency of multiple pregnancies?

Twins, 1 in 90 pregnancies; triplets, 1 in 7000; and quadruplets, 1 in 370,000. Authentic cases are on record of five and six children at a birth.

What are the causes of multiple pregnancies?

The great causes are multiparity and heredity; other causes are climate, great development of the ovaries, race, and stature.

How is super-impregnation divided?

Into super-fecundation and super-fœtation.

What is super-fecundation?

The successive fecundation of two or more ovules at or near the same coitus; it is not simultaneous.

What is super-fœtation?

After conception has occurred, and the uterus is already occupied by the product of conception, a second impregnation results from a subsequent coitus.

Is super-fœtation possible?

There is no anatomical impossibility against its occurrence prior to the union of the ovular and uterine deciduæ. There is, however, but little probability of its taking place.

Describe the fœtal appendages in twin pregnancies.

If the pregnancy results from the fecundation of two ovules, there is no vascular connection between the placentæ. Each fœtus

has an independent chorion and amnion, and, at first, each has its own ovular decidua, but later on the intervening part is absorbed, so that there is but one.

If the pregnancy results from the fecundation of a single ovule containing two germs, or a single germ dividing into two, there is a single placenta and the bloodvessels communicate. There is also a single chorion, but each fœtus has its own amnion; in rare cases there is but one amnion. Twins developed from the same ovum are always of the same sex.

Is the weight of twins greater than that of a single fœtus?

Yes, generally; but each fœtal weight is less than that of children born single.

What is the course of multiple pregnancies?

Premature labor generally occurs, due to over-distention of the uterus. Triplets rarely go to term, and quadruplets never. One of the fœtuses may die early, and either be expelled, and pregnancy continue, or it may be retained and undergo certain changes.

Diagnosis of Multiple Pregnancies.

How are the signs divided?

Into: 1. Probable signs. 2. Certain signs.

What are the probable signs?

1. Unusual size of the abdomen at a given period of pregnancy.

2. Unusual shape of the abdomen; it is bulging at the flanks and flat in the median line. In some cases the abdomen is divided in the median line by a depression, or sulcus.

3. The fœtal movements are stronger, more frequent, and more general.

4. The disorders of pregnancy are exaggerated. There is greater fulness of the veins, and more liability to œdema of the lower extremities; there may also be an œdematous swelling immediately above the pubes.

5. There is more liability to premature labor.

How are the certain signs determined?

By touch and auscultation.

What signs are determined by touch?

1. Ballottement is prevented.
2. The uterus is tense and resisting.
3. The fœtal members are felt in different parts of the uterus.
4. The presence of two fœtal heads.

After labor has begun the bag of waters may be found divided, by a furrow, into two parts.

What signs are determined by auscultation?

The sounds of two fœtal hearts. The sounds are without isochronism, and with the maximum of intensity at different points.

Diseases of Pregnancy.

Nausea and Vomiting

What are the principal causes?

1. Stretching of the uterus by the growing ovum.
2. Diseases of the cervix, uterus, and adnexa.
3. Positional disorders of the uterus.

What is the treatment?

Nothing need be done as long as the food is properly digested, and the general condition of the patient remains good. The symptoms generally disappear during the fourth month.

In graver cases the treatment should be as follows, viz.:

1. Hygienic treatment: Breakfast should be taken in bed one or two hours before getting up. Give lime-water, iced drinks, milk, champagne, etc. It is advisable to send the patient away, giving her a change of scene, and a rest from sexual intercourse. The diet should be carefully regulated. If taking solid food is followed by vomiting, give light and easily digested food at short intervals. If the patient expresses a desire for any special article of diet it should be given to her.

2. Medical treatment:

a. The bowels should be carefully regulated.

b. The following medicines have been recommended: The tincture of nux vomica given in five to ten-drop doses before meals;

subnitrate of bismuth; oxalate of cerium, in five to ten grain doses; Fowler's solution; morphia, given hypodermically; chloral, twenty to thirty grains per rectum, night and morning; hydrocyanic acid (dilute), given in three to five drop doses, with an effervescing draught; wine of ipecacuanha, in minim doses, given every hour, or three or four times daily; salicin, in three to five grain doses, three times a day; bromide of potassium, combined with chloral; carbonic acid water; creasote; belladonna and the tincture of aconite root.

c. Local treatment: If the cervix is eroded, apply a ten per cent. solution of nitrate of silver every two or three days; carbolic acid may also be used. To relieve the irritability of the uterus, vaginal suppositories of morphia are highly recommended; the application of belladonna to the cervix is also advised.

If the uterus is retroverted, or retroflexed, it should be restored and kept in position by a pessary. If the cervix is found inflamed, apply nitrate of silver or a tampon of glycerine; leeches have also been used. In some cases dilatation of the cervical canal, either by means of the finger, or a steel dilator devised for the purpose, will be followed by remarkable results.

d. Other remedies: Hot water, frequently taken in small amounts; faradic current applied to the epigastrium; inhalations of oxygen; ice-bag to the cervical vertebræ; ether spray applied to the epigastrium; small pieces of ice sucked ad libitum.

e. Rectal alimentation. This subject will be considered under the treatment of hyperemesis.

Hyperemesis.

What is hyperemesis?

"Obstinate, incoercible, uncontrollable, pernicious vomiting of pregnancy" (Parvin).

At what period of pregnancy does it usually begin?

The majority of cases begin about the end of the third month.

Into how many stages are the symptoms divided?

Three stages.

Describe the symptoms.

First Stage. The onset is seldom sudden; usually the vomiting passes gradually from the simple form into the graver; but this is not always the case. In the beginning there is nothing characteristic of the disease, but later the nausea becomes more and more constant, and the vomiting almost incessant. The matter vomited is composed of food mixed with mucus and bile, and, in some cases, blood; pure bile is sometimes vomited.

The incessant vomiting causes fatigue and gastric pains; in some cases the vomiting is unaccompanied by straining. In others there are occasional remissions, or the rejection of food is incessant, and the patient rapidly becomes emaciated and loses strength, the expression becoming anxious. Salivation and diarrhœa may occur, still further complicating the case.

Second Stage. This stage is characterized by a continuous fever, which becomes more and more pronounced, and by the symptoms of the first stage becoming more marked. The extremities become cold and clammy, the skin of the face and trunk hot and dry, and the stomach rejects everything taken into it. The tongue, throat, and mouth become dry, the breath foul, and the thirst excessive. The urine is high colored and scanty, and diarrhœa is constant. There are severe pains in the head, and also over the stomach and the hypochondriac regions. There are great emaciation and loss of strength, and frequent attacks of syncope. In very rare cases remissions occur.

Third Stage. The fever increases, but the vomiting stops. The pulse becomes small and thin, beating from 120 to 140. Hallucinations and delirium appear, followed by coma.

What is the duration of the disease?

In the majority of cases from two to three months.

What is the prognosis?

Grave, especially in the second stage; in the third stage, death almost inevitably occurs. Spontaneous abortion or death of the fœtus is favorable.

What diseases may be mistaken for hyperemesis?

It is to be distinguished from the vomiting caused by albu-

minuria, tuberculous meningitis, and ulcer or carcinoma of the stomach.

How is the treatment divided?

Into: 1. Dietetic and hygienic. 2. Medical. 3. Surgical. 4. Obstetric.

What is the treatment?

1. Diet: If the vomiting is absolutely uncontrollable the patient should be supported entirely by rectal enamas, and kept at rest in bed.

The following articles are recommended for rectal alimentation:

Beef-tea, bromide of potassium, tincture of opium, and brandy every four hours, continued for two days. Then begin giving food by the stomach; using at first milk and lime-water. (Busey.)

Animal broths,

Peptonized milk,

Whites of eggs in water,

Leube's pancreatic meat emulsion,

Defibrinated blood.

When there is great thirst, inject into the rectum eight ounces of water and the whites of two eggs, three times a day; this should be given in addition to the regular enemas.

The quantity of an enema should be from four to six ounces; it should be given three or four times a day (Lusk).

After the stomach is able to retain food, give the following:

Peptonized milk,

Meat balls,

Pancreatic solutions of meat,

Effervescing koumyss,

Milk and lime-water,

Cocoa and milk.

In some cases it is well to allow the patient any article of diet she may specially desire.

2. Medical treatment: This subject has already been considered (nausea and vomiting).

3. Surgical treatment: This subject has already been considered (nausea and vomiting).

4. Obstetric treatment: This consists in the induction of abor-

tion or premature labor. The cause of death in many cases of hyperemesis is due to delay on the part of the physician in performing one or the other of these operations; neither operation should be undertaken, however, without the advice of a consultant.

Œdema. Varicose Veins.

What is the treatment of œdema of the lower limbs?

The patient should lie down and slightly elevate the limbs; all constrictions must be removed, and the parts should be bathed several times a day with cold water. If the skin becomes tense and the patient suffers much pain, warm flannel should be wrapped around the limbs, and diaphoretics and tonics administered.

What is the treatment of œdema of the vulva?

If the œdema is extensive, the parts should be punctured so as to allow free drainage; this should be done with strict antiseptic precaution. In cases where the œdema is slight, the recumbent position and frequent applications of cold water are found useful.

What is the treatment of varicose veins of the lower limbs?

The bowels should be carefully regulated. The patient should, as often as possible, assume a recumbent position. An elastic stocking should be worn or a flannel bandage applied; care should be taken not to apply the bandage too tightly, as too great compression may be followed by abortion or premature labor. The patient should be provided with a compress and bandage and shown how to apply them, or how to make digital compression, in case of rupture occurring in one of the veins.

What is the treatment of rupture of a vein?

A compress should be placed over the point of rupture and a bandage firmly applied, or a needle may be carried below the bleeding vessel and a figure-of-8 ligature carried around it.

What is a thrombus?

A hemorrhage beneath the skin, due to the rupture of a vessel.

How is it treated?

By rest and the application of cold dressings.

How are varicose veins of the vulva treated?

Rest in the recumbent position, and the use of an abdominal bandage to support the uterus, and a T-binder.

Salivation. Relaxation of the Pelvic Joints.

What is the treatment of salivation?

All forms of treatment are unreliable in this affection; it usually persists to the end of pregnancy. The following remedies are recommended:

Bromide of potassium; small doses of atropia; pilocarpine, in doses of one-half of a grain; the fluid extract of virburnum prunifolium; counter-irritation over the parotids, by means of small blisters, or the tincture of iodine; astringent mouth-washes of tannin, chlorate of potassa, sulphate of zinc, or brandy; opium given internally; inhalations of turpentine, or creasote, or dry bitter orange peel kept in the mouth. The bowels should be kept regulated by saline laxatives.

"A sudden suppression of the excessive secretion may be followed by serious consequences" (Parvin).

What are the indications for treatment in relaxation of the pelvic articulations?

1. Rest.
2. To secure the immobility of the joints.

Rest. The patient should be kept in bed during pregnancy; any efforts to walk, or take exercise are followed by injurious results. After labor the patient should remain in bed for six weeks or two months.

To secure immobility of the joints. When the patient is allowed to get out of bed the articulations should be held firmly together by means of a towel, or roller bandage, or a hip-binder of strong cloth. If the relaxation is marked, the joints should be supported by a leather girdle (Boyer), or a complete metallic girdle (Martin), or a plaster-of-Paris bandage.

Diseases of the Organs of Generation.

Pruritus. Vegetations of the vulva. Leucorrhœa. Displacements of the uterus.

What is pruritus vulvæ?

An itching of the external genital organs.

What is its etiology?

It may be caused by any irritative discharge from the vagina, due to malignant disease of the uterus, erosion of the cervix, cervical catarrh, etc. Diabetes may cause it, and also various local conditions of the vulva, as œdema, eczema, herpes, follicular inflammation, or prurigo. Menstruation and pregnancy, by producing a congestion of the genitals, may produce a pruritus. Generally in pruritus vulvæ, occurring during pregnancy, there is no visible lesion of the parts.

How is pruritus vulvæ treated?

The first indication is to remove, if possible, the cause.

Cervical catarrh and erosion: Apply nitrate of silver 30 or 60 grains to the ounce, to the cervical canal and the erosion, and introduce a cotton tampon saturated with tannin and glycerine (tannin, ℥j; glycerine, ℥j), or acetate of lead ℥ij to glycerine ℥j. The application to the cervix should be made every four or five days; the tampon should be introduced every night at bedtime, and removed on getting up in the morning.

If the pruritus depends upon a vaginitis, use astringent or alterative applications to the vagina; a solution of corrosive sublimate, 1 part to 2000; nitrate of silver, 30 to 60 grains to the ounce; sulphate of zinc, 2 or 3 grains to the ounce; or alum, 4 or 5 grains to the ounce. A boracic acid tampon is often followed by good results. The tampon is dipped in glycerin and then covered with boracic acid; it should be introduced into the vagina at night and removed in the morning.

The following is the general treatment of pruritus vulvæ:

The vagina should be injected twice daily with a solution of borax, or a weak solution of carbolic acid. It is of the utmost importance that all injections into the vagina should be tepid, not

hot, and that they should be used without any force, as pregnancy might be interrupted. The vulva should be painted over with a solution of nitrate of silver (gr. x to ℥j), or a weak solution of carbolic acid, or borax may be used; in some cases the frequent application of hot or cold water succeeds. Corrosive sublimate, 1 part to 2000, muriate of cocaine (4 to 10 per cent.), or a solution of atropia are also recommended. Ointments containing oxide of zinc, iodoform, or salicylic acid, often do good.

To secure rest at night the administration of morphia or chloral may be found necessary; the tincture of cannabis indica, or one of the alkaline bromides may also be used for this purpose.

How are vegetations of the vulva treated?

No active treatment is advisable, unless they become very large, as they disappear at the end of pregnancy; if removed, they are very liable to return. The surfaces should be kept apart and compresses saturated in a solution of carbolic acid, or Labarraque's solution, applied.

What is the treatment of leucorrhœa?

If the discharge be slight, use tepid astringent injections: alum, borax, sulphate of zinc, carbolic acid, chlorate of potassium, or common salt.

If the secretions are excessive and cause irritation of the genitals, the use of the cotton tampon is the best treatment. Take a dry tampon of cotton and enclose in it, either boracic acid, alum, or the subnitrate of bismuth. Then introduce into the vagina and allow it to remain for twelve or twenty-four hours; after its removal use a tepid astringent injection. A tampon saturated with glycerine containing either boracic acid or tannin may be used in the place of the dry tampon. A new tampon should be introduced into the vagina every day for three or four days. If the leucorrhœa be specific in origin, give a vaginal douche of a solution of corrosive sublimate, 1 part to 1000, or apply nitrate of silver, 30 to 60 grains to the ounce.

What is the indication for treatment in prolapse of the uterus?

To reduce the prolapse: The patient should assume a recumbent

position as often as possible and wear a pessary; in most cases the prolapse is spontaneously cured about the fourth month. In cases where a pessary cannot be worn, support the uterus with a cotton tampon. If the uterus protrudes externally and cannot be restored to its normal position, then a bandage must be applied to support it.

A pessary may be worn until the sixth month; the best intrument to use is the Smith-Hodge pessary.

After labor the patient should have a prolonged rest in bed.

Are anterior displacements of the uterus considered of importance during pregnancy?

No; they are seldom sufficiently marked to be pathologic. In the multigravida the uterus is always more or less anteverted, on account of the relaxation of the abdominal muscles. If the anteversion is moderate, no symptoms are produced; but if it is marked, there are constipation, tenesmus, pains in the lumbar and sacral region, and irritability of the bladder. Anterior displacement due to hysteropexy may become serious.

What is the treatment of anteversion?

The bowels should be regulated, and the patient kept in a recumbent position. The uterus may be supported by the open cup-pessary of Thomas.

In the latter months of pregnancy an abdominal bandage must be firmly applied to support the uterus.

Is retroversion of the uterus a frequent complication of pregnancy?

No; it is infrequent in the impregnated uterus.

What are the results of retroversion?

1. It spontaneously rises into the abdominal cavity.

2. It remains below the promontory of the sacrum, and the cervix bending upon itself, it becomes a retroflexion.

What are the results of retroflexion?

1. It usually rises into the abdominal cavity and the pregnancy may continue to term.

2. Abortion may occur, the result of inflammation of the uterus.

3. The uterus may become incarcerated below the promontory of the sacrum and later may become sacculated.

What is the treatment of retroflexion?

If the uterus is movable, it should be replaced and a pessary worn until the fourth month; use the Albert Smith or Hodge pessary. The bowels should be kept regular, and urine should not be allowed to accumulate in the bladder; there should be no compression around the abdomen, and straining at stool should be avoided. The patient should assume the knee-chest position for a few minutes every day, and when lying in bed should not be upon her back, but upon her side.

If the uterus is immovable, gradual attempts to restore it should be made daily, as follows:

1. The patient assumes the knee-chest position, and the physician introduces two fingers, either into the rectum or vagina, and makes gentle pressure upon the fundus of the uterus; the uterus may be gradually restored in about a week or longer.

2. The "push and pull" method: press the body of the uterus up with the blade of a Sim's speculum, and at the same time catch the cervix with a tenaculum and draw it downward and backward.

After the uterus has been restored to its normal position a pessary should be worn.

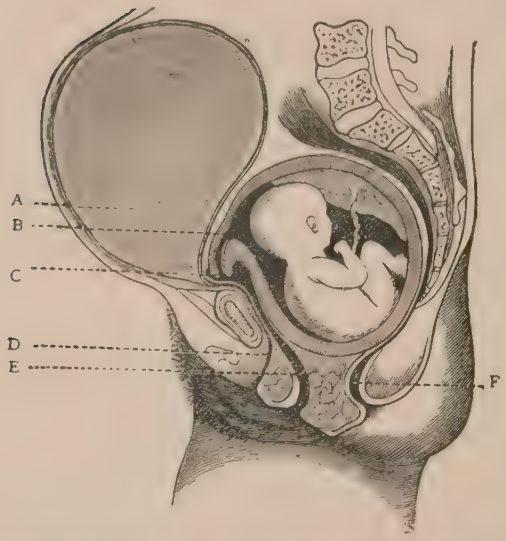
What are the symptoms of incarceration? See fig. 23.

Retention of urine, in some cases associated with incontinence; difficult and painful defecation; constipation; severe pains in the lumbar and sacral regions; a heavy bearing-down sensation in the pelvis; and, in some cases, œdema of the legs and arms. If the incarceration is not relieved, peritonitis and uræmia follow.

What are the results of incarceration?

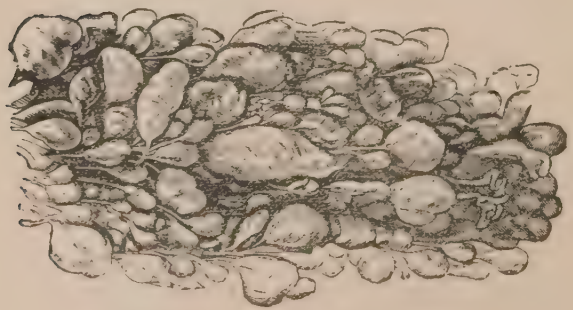
1. Spontaneous restitution.
2. Abortion and recovery.
3. Cystitis; retention of urine.
4. Inability to empty the bowels.
5. Death from: *a*. Metritis. *b*. Perforation of the bladder. *c*. Gangrene of the uterus. *d*. Uræmia. *e*. Peritonitis.

FIG. 23.



Retroflexion of the gravid uterus with incarceration. *A*, bladder; *B*, internal orifice; *C*, external orifice; *D*, urethra; *E*, vagina; *F*, rectum.

FIG. 24.



Hydatidiform degeneration of the chorion.

What are the results of the retention of urine?

In six days the mucous membrane of the bladder sloughs; in ten days perforation occurs.

What is sacculation of the uterus?

A rare termination of incarceration in which the free wall of the uterus distends without rupture to accommodate the growing fœtus.

What is the treatment of incarceration?

The indication is to replace the uterus. The bladder and bowels should be evacuated, the former with a catheter; if this is found to be impossible, then aspirate about three inches above the pubes. In a number of cases spontaneous restitution occurs after the bladder is emptied; if this does not occur, then the uterus must be replaced. If the uterus is bound down by adhesions and cannot be restored, then abortion must be induced.

To restore the uterus place the patient in the knee-chest position and make steady pressure upon the fundus with two fingers either in the vagina or rectum. Another plan is the "push and pull" method already referred to. In cases requiring the use of an anæsthetic, place the patient in Sims' latero-prone position and make pressure upon the fundus of the uterus by means of four fingers introduced into either the vagina or rectum. Playfair, in cases of incarceration, advises the use of a rubber bag introduced into the vagina and filled with water: the water must be let out every few hours to allow the woman to empty the bladder. Generally the uterus is replaced in twenty-four hours by this method.

After the uterus has been replaced, the patient should wear a pessary; a relapse is not likely to occur.

Diseases of the Ovum.

Myxomatous Degeneration of the Placenta, or Hydatidiform Mole.

What is the morbid anatomy? See fig. 24.

It is a disease of the chorial villi. A great number of cyst-like formations are found, varying in size from a millet-seed to a walnut; the cysts are of many different shapes. The investing epithelium of the villi and their contents undergo hypertrophy and mucoid degeneration. The pedicle of a cyst contains the

same tissue as Wharton's jelly of the umbilical cord. The cysts contain albumen and mucin, which resemble in appearance the liquor amnii.

If the disease occurs before the second month, the degeneration involves the entire surface of the chorion, resulting in the death of the embryo, which undergoes solution, leaving the amniotic cavity empty; the vessels of the villi are obliterated. If the disease occurs after the placenta begins to form, the degeneration is limited to the placental part of the chorion; although in some cases cysts are found in other parts. If the degeneration be sufficient to destroy the fœtus, it becomes disintegrated and is found in the amnion cavity. If only a portion of the placenta is involved, the fœtus may go to term; the uterus may contain, occasionally, a healthy fœtus together with an hydatidiform mole.

An hydatidiform mole resembles in appearance a bunch of grapes or currants.

Retention of the placenta or rupture of the uterus may occur in this disease, caused by the degenerated villi penetrating into the uterine sinuses.

What is the etiology of hydatidiform mole?

The disease is less frequent in primiparæ than in multiparæ; it is more frequent in women of advanced age; it generally occurs during the first months of pregnancy, but it cannot occur after the latter part of the third month.

The exciting causes of this disease are as yet unsettled. They may be maternal in origin or due to disease of the ovum. In proof of the former theory may be mentioned the frequent recurrence of the condition in the same woman, and its frequent association with uterine fibroids and with a carcinomatous or syphilitic dyscrasia. The probability of the latter theory is supported by the fact that a healthy fœtus is occasionally found associated with a hydatidiform mole. Again, cases occur in which the death of the fœtus cannot be accounted for by the degeneration of the villi on account of the limited extent of the disease. Spiegelberg believes the disease to be due to an abnormal development of the allantois.

Describe the symptoms.

1. Rapid enlargement of the abdomen.

2. Attacks of hemorrhage, or a muco-sanguinolent discharge.
3. Expulsion of vesicles.
4. Doughy feel of the uterus on palpation.
5. Obscure fluctuation.
6. The fœtal members cannot be recognized by palpation.
7. The lower segment of the uterus is tense.
8. Lumbar and sacral pains.
9. The fœtal heart sounds cannot be heard.
10. Ballottement is prevented.

The diagnosis is made by the above subjective and objective symptoms; the discharge of vesicles is the only certain symptom.

What is the prognosis?

The patient never goes to term and the fœtus in nearly all cases dies. The danger to the mother is from hemorrhage and sepsis.

What is the treatment?

If the hemorrhage is slight, no active treatment is advised. Place the patient at rest, and give cold drinks and opium.

If the hemorrhage is grave, then introduce a tampon and give ergot.

If the hemorrhage returns, then the indication is to dilate the cervical canal and empty the uterus.

The dilatation of the cervix may be accomplished by the finger, or by Barnes's or Tarnier's dilator. The use of tents increases the dangers of septicæmia. After the uterus is emptied of its contents, wash out the cavity with a warm solution of corrosive sublimate, 1 part to 3000. If hemorrhage occurs, apply the perchloride of iron. The after-treatment consists of rest and the administration of ergot. The use of Thomas's dull-wire curette is advised in cases where there is a persistent hemorrhage.

Polyhydramnios.

What is polyhydramnios?

An excess in the amount of liquor amnii.

What is the etiology of polyhydramnios?

There are various theories, as follows:

1. Patulous condition of the vasa propria.

2. Disease of the fœtal heart, lungs, or liver.
3. Increased activity of the kidneys.
4. Changes in the maternal circulation.
5. A morbid condition of the decidua, chorion, or amnion.
6. Syphilis.

The disease is more frequent in the multigravida than in the primigravida.

How many forms of the disease are described?

Two: an acute and chronic form.

What are the symptoms of polyhydramnios?

1. Rapid development of the uterus.
2. The uterine walls are tense and elastic.
3. Obscure sense of fluctuation.
4. Fœtal heart sounds faint or absent.
5. Fœtus cannot be recognized by palpation.
6. The cervix is high up and more or less shortened.
7. The fœtus moves from one position to another with great ease.

Other symptoms are: dyspnœa, palpitation of the heart, irritability of the stomach, œdema of the lower extremities, and inguinal, lumbar, sacral, and abdominal pains.

The symptoms occur, as a rule, about the fourth or fifth month; in some cases earlier. The accumulation of fluid is gradual.

In the acute form the accumulation of fluid may take place in a few days; in addition to the symptoms of the chronic form, fever, vomiting, and intense pain, are present.

What is the diagnosis?

The diagnosis depends upon the subjective and objective symptoms already described. Braxton Hicks's sign is of great value in determining the existence of pregnancy. Polyhydramnios may be mistaken for a multiple pregnancy.

What is the prognosis?

Very grave for the child; nearly one-fourth die. The prognosis for the mother is favorable, unless the disease is associated with an organic affection of the heart. The danger of post-partum hemorrhage should not be forgotten.

How is the treatment divided?

Into 1, the expectant plan; 2, the active plan.

The former consists in the use of an abdominal supporter, and refraining from active exercise. The latter, or active plan of treatment, is indicated whenever grave symptoms are present, due to over-distention, and when there are serious disturbances of the mother's heart. The indication is to induce abortion or premature labor. The membranes should be punctured high up, and in the interval of the pains. The hand should be used as a plug in the vagina to prevent the rapid discharge of the liquor amnii. If the presentation is normal, leave the further progress of the case to nature; turning is indicated if the fœtus presents by the shoulders. Prophylactic measures should be taken against post-partum hemorrhage.

Abortion.

What is abortion?

"Abortion, or miscarriage, is the expulsion of the product of conception before the time that the fœtus is viable" (Parvin).

How is abortion divided?

Into 1. Ovular; during the first three weeks.
2. Embryonic; up to the fourth month.
3. Fœtal; subsequent to the fourth month.

How is abortion classified?

Into 1. Spontaneous.
2. Artificial; subdivided into
(*a*) Therapeutic.
(*b*) Criminal.

According to some authorities, the term abortion is used when the ovum is expelled during the first three months; subsequent to the third month up to the time of viability, the term miscarriage is employed.

What is meant by the term incomplete abortion?

The expulsion of the embryo or fœtus without the membranes or placenta.

What is meant by the term missed abortion?

The death of the fœtus not followed, within two weeks, by its expulsion.

At what period of pregnancy do abortions usually occur?

Spontaneous abortions generally occur in the first three months; and, as a rule, at a time corresponding with what would have been a monthly flow. Criminal abortions usually occur from the third to the sixth month.

How are causes of abortion divided?

Into the paternal, maternal, and ovular causes.

What are the paternal causes?

1. Syphilis.
2. Alcoholism.
3. Exhausting chronic diseases.
4. Working in sulphur.
5. Sexual excesses.
6. Old age or extreme youth.
7. Lead-poisoning.

How are the maternal causes divided?

Into external and internal causes.

What are external causes?

1. Violent exercise.
2. Traumatisms; accidental or intentional.
3. Tight corsets.
4. Pressure upon varicose veins.
5. Surgical operations.
6. Coition.
7. High altitudes.
8. Hot vaginal injections and baths.

What are internal causes?

1. Infectious diseases (acute).
   Abortion due to (*a*) High temperature.
   (*b*) Hemorrhagic endometritis.
   (*c*) The infection of the fœtus.
2. Chronic diseases, especially syphilis.

3. Causes due to the uterus.
   (*a*) Displacements.
   (*b*) Endometritis.
   (*c*) Structural disorders.
4. Pelvic adhesions.
5. Tumors.
6. Lead-poisoning.
7. Working in tobacco.
8. Organic diseases of the kidneys.
9. Sneezing, coughing, vomiting, diarrhœa, and dysentery.
10. Mental emotions.
11. Emmenagogue medicines.

What are the ovular causes?

Any of the diseases which may cause the death of the embryo or fœtus, such as

1. Diseases of the decidua.
2. Diseases of the placenta.
   (*a*) Apoplexy.
   (*b*) Inflammation.
   (*c*) Fatty degeneration.
   (*d*) Syphilis.
   (*e*) Myxomatous degeneration.
3. Polyhydramnios.
4. Placenta prævia.
5. Infectious diseases.
6. Diseases and compression of the cord.

Are some women liable to a recurrence of abortion?

Yes. Habit is not to be regarded as a factor; it is always due to the original predisposing cause still acting.

How are the symptoms of abortion classified?

Into premonitory and characteristic symptoms.

What are the premonitory symptoms?

These are rarely absent after the second month. They are pelvic weight and fulness, pains in the lumbar and sacral regions, irritability of the bladder or rectum, alternate sensations of chilli-

ness and heat, and a feeling of malaise; the secretions of the vagina are also increased.

What are the characteristic symptoms?

Hemorrhage and painful uterine contractions.

Abortions occurring in the first two months resemble a profuse menstrual flow, associated with dysmenorrhœa. The pain is caused by uterine congestion and by the expulsion of clots. These symptoms continue for four or five days, and the product of conception is expelled from the vagina, surrounded by clots, or in fragments, along with the decidua.

In abortions occurring prior to three months, the ovum, as a rule, is expelled entire; subsequent to three months, the ovum generally ruptures and the fœtus is expelled, while the appendages are retained for a greater or less length of time.

Hemorrhage is less likely to occur the nearer the abortion takes place to the seventh month. The uterine decidua is more easily thrown off in late than in early abortions. After the placenta is formed the source of the hemorrhage is from the placental site; but before, it is from the entire surface of the uterine cavity.

What are the immediate dangers of abortion?

1. Hemorrhage with extreme anæmia.
2. Septicæmia.
3. Tetanus (rare).

What are the remote dangers?

1. Chronic parenchymatous metritis (subinvolution.)
2. Placental polypus.
3. Misplacements of the uterus.

Under what conditions is an abortion inevitable?

1. Death of the embryo or fœtus.
2. An extensive detachment of the ovum.
3. Rupture of the ovum.

How is a beginning abortion recognized?

By the painful uterine contractions, hemorrhage, dilatation of the cervix, and the ovum felt through the os uteri.

How is the treatment of abortion divided?

1. The prophylactic treatment.
2. The treatment of threatened abortion.
3. The treatment of inevitable abortion.

What is the prophylactic treatment?

This consists in treating the cause of an abortion. Either syphilis, or retroflexion of the uterus, or endometritis, is most frequently found to be the cause in frequently recurring abortions.

The patient should avoid all active exercise, especially during that period of gestation in which she has been in the habit of aborting. She should also rest at the time of the menstrual epochs. Sexual intercourse is often the cause of an abortion and should be forbidden. Sir J. Y. Simpson recommended the chlorate of potassium in certain diseases of the placenta; it may be given in doses of ten to twenty grains three times daily. In cases of habitual abortion the fluid extract of viburnum prunifolium has been advised; it may be given three times daily in doses of half a teaspoonful to a teaspoonful. The danger of abortion occurring is greatly lessened after the fourth month.

What is the treatment of threatened abortion?

In all cases occurring in the early months of pregnancy there should be an examination made to ascertain the position of the uterus. If it is found retroflexed or retroverted, it should at once be replaced. The general treatment of threatened abortion is as follows: The patient should be placed in bed with light covering, and given cold drinks; laudanum should be administered per rectum (twenty drops) every hour for three or four hours if the uterine contractions continue. Suppositories of opium may be used in place of laudanum. If there be restlessness and excitement, give twenty to thirty grains of chloral along with one of the injections of laudanum. The urine should be voided in the bed-pan at regular intervals; the bowels should be emptied every other day by means of an injection, or by a mild laxative. The patient should remain in bed for a week after all symptoms have disappeared. If there be a recurrence of the symptoms, she should immediately return to bed.

What are the indications and the treatment of inevitable abortion?

To control the hemorrhage and to empty the uterus.

To meet these indications the tampon should be used, and left in the vagina for eight hours or more. If the hemorrhage is grave, tampon the entire vagina, and apply a T-bandage; if slight, tampon only the upper third of the vagina. The tampon may remain twelve or twenty-four hours, when it must be removed; if the hemorrhage continues, it should be repeated. Generally after the removal of the tampon the ovum will be found in the vagina, or it may have descended into the cervical canal; in the latter case the ovum forms a plug, and it may now be necessary to repeat the tampon; compression of the uterus, under these circumstances, will, in some cases, expel the ovum. Great care should be taken in the first three months not to rupture the ovum, as there would be great danger, if the accident occurred, of the abortion being incomplete. Before using the tampon empty the bladder, and wash out the vagina with a solution of corrosive sublimate, 1 part to 2000; the balls of absorbent cotton first introduced into the vagina should be dipped in carbolized water or covered with iodoform. After the removal of the tampon, again wash out the vagina with the solution of corrosive sublimate.

In abortion occurring in the first two months, no active treatment, as a rule, is necessary; the patient should be kept at rest in bed for several days.

In cases of complete abortion active treatment is rarely necessary; the ovum forms a plug which occupies the cervical canal and controls the hemorrhage.

What are the uses of the tampon in the treatment of abortion?

1. To control hemorrhage.
2. To stimulate contractions of the uterus.
3. To assist in the separation of the ovum from the uterus by allowing blood to accumulate between them.

What is the treatment of an incomplete abortion in the first three months?

1. The expectant plan; or
2. The active plan.

Those who follow the expectant plan of treatment advise waiting until the appendages have been separated from the uterine cavity; this is indicated by hemorrhage followed in a day or two by an offensive discharge. The os is then dilated with Hegar's hard-rubber dilators, and the uterine cavity washed out with a warm solution of corrosive sublimate, 1 part to 3000. Next one or two fingers are introduced into the uterine cavity, at the same time making firm pressure externally with the other hand upon the fundus of the uterus; or the uterus may be drawn down with the volsella, and then the fingers introduced. After detaching the membranes they are carried down to the os uteri where they can be seized by the finger and thumb and withdrawn.

If the digital method fails, Emmet's curette forceps should be used. After the appendages have been entirely removed, Churchill's tincture of iodine should be applied to the uterine cavity.

Those who employ the active plan of treatment immediately empty the uterus of the retained appendages by means of either forceps or curettes.

The strictest antiseptic precautions should be employed in the treatment of incomplete abortion. The hands and instruments should be rendered thoroughly aseptic; the vagina and uterine cavity should be washed out with a solution of corrosive sublimate before and after the removal of the remains of the ovum.

What is the indication for treatment in an incomplete abortion subsequent to the fourth month?

To empty the uterus.

Expression of the uterus will generally cause the placenta and membranes to be expelled; other cases require dilatation of the os and the use of the fingers or the curette forceps.

Should the uterine cavity be washed out with an antiseptic solution after a complete abortion?

No; not unless symptoms of septicæmia occur. The uterus should only be irrigated in those cases requiring the introduction of the fingers or instruments into its cavity.

What antiseptic precautions should be taken after an abortion?

The vagina should be washed out with a warm solution of corrosive sublimate, 1 part to 2000, immediately after the ovum is expelled. The external organs should be bathed twice a day with a solution of corrosive sublimate, and kept covered with corrosive sublimate gauze.

What is the after-treatment of abortion?

The patient must remain at rest in the recumbent position for the same length of time as after a labor at full term.

What is the indication for treatment in missed abortion?

To empty the uterus.

Ectopic Development of the Ovum.

How is ectopic gestation divided?

Into 1. Primitive cervical pregnancy.
2. Extra-uterine pregnancy.

What is primitive cervical pregnancy?

The arrest and development of the ovum in the cervical canal; this variety of ectopic gestation is very rare, and abortion occurs in the first three months.

What are the varieties of extra-uterine pregnancy?

1. Tubal.
   - (*a*) Interstitial.—Tubo-uterine.
   - (*b*) Tubo-abdominal.
   - (*c*) Tubo-ovarian.
   - (*d*) Pregnancy in the rudimentary cornu of a one-horned uterus.
2. Abdominal.
   - (*a*) Primary.
   - (*b*) Secondary.
3. Ovarian.

Describe the cause, course, and termination, of tubal pregnancy. See figs. 25 and 26.

Cause.—Inflammations of the mucous membrane associated with

Fig. 25.

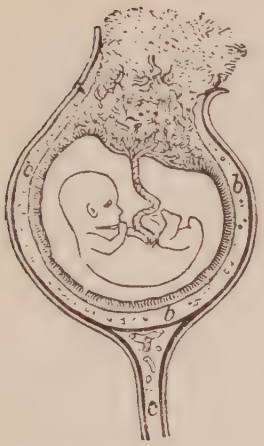
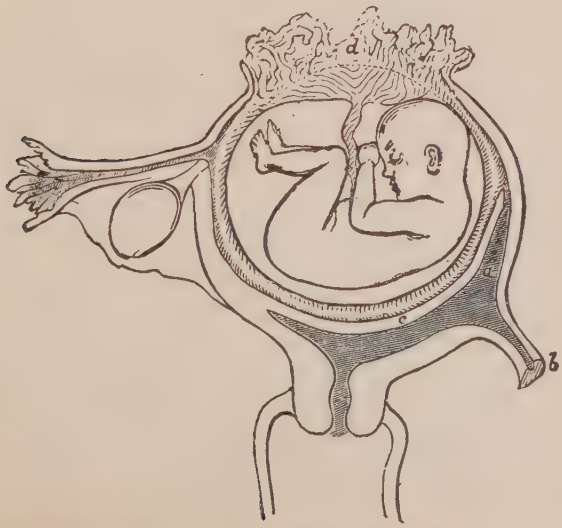


Fig. 26.

Diagrammatic section of Fallopian tube representing the two directions of rupture. 2, into the peritoneal cavity; 3, into the cavity of the broad ligament; *a*, clot at point of rupture; *b*, wall of Fallopian tube; *c*, cavity of the broad ligament with (3) folds separated by hæmic effusion, *a*. (Tait.)

Fig. 27.



Diagrammatic representation of interstitial tubal pregnancy at time of rupture (Tait.)

loss of the ciliæ; dilatation and hernial pouches; flexions and constrictions; polypus; pelvic tumors pressing upon the tube, and occlusion due to inflammation. In cases of complete occlusion there is a transmigration of the spermatozoids; cases of transmigration of the ovule occur in some cases. The tube may be large enough for the spermatozoids to enter, but too small to allow the ovum to pass through. Cases are recorded of two ovules passing through the tube at the same time, the one in advance blocking the way of the other; the former developing in the uterus, the latter in the tube.

Course.—The mucous membrane of the tube undergoes hypertrophy, and the villi become attached to it. Generally the uterine and abdominal openings are closed; in some cases the uterine opening remains patulous. The villi of the chorion forming the placenta penetrate to the muscular coat. At the beginning of pregnancy the muscular coat of the tube thickens, but later on it becomes thin, due to the stretching caused by the ovum.

Termination.—Rupture usually occurs within the first two or three months; in some cases the pregnancy may go on to term. After rupture the entire ovum, or only the embryo or fœtus may escape into the abdominal cavity, or in some cases the entire ovum may remain in the tube. Rupture, in many cases, is followed by death caused either by internal hemorrhage or peritonitis. Recovery may occur when the product of conception dies prior to rupture. Rupture may occur between the folds of the broad ligament; this is an extra-peritoneal or broad-ligament pregnancy.

Describe the course of an interstitial pregnancy. See fig. 27.

This variety of extra-uterine pregnancy is also known as tubo-uterine. The ovum is developed in that portion of the oviduct which passes through the wall of the uterus. In the beginning of pregnancy the muscular tissue undergoes hypertrophy, and forms a sac around the ovum. As a rule, the ovum develops more rapidly than the muscular tissue, and rupture takes place generally prior to the third month; in rare cases gestation may go on to term. When the ovum is situated near the uterine cavity it may be expelled into the uterus and abortion follow.

Describe the course of tubo-abdominal and tubo-ovarian pregnancies.

Tubo-abdominal.—The ovum is developed in the ampulla of the oviduct and growing outward extends into the abdominal cavity. It is surrounded by the broad ligament, the ovary, the mesentery, the bladder, the intestines, and the uterus, which are all bound together by a plastic exudation, the result of a local peritonitis. In the beginning of gestation the ovum descends into Douglas's cul-de-sac. The external covering of the ovum in advanced pregnancy may include the liver, kidneys, and spleen. The placenta is, as a rule, formed in the pelvic cavity.

Tubo-ovarian.—The external sac of the ovum is formed by the oviduct and ovary, which are surrounded and bound together by an inflammatory exudation.

In both of the above varieties of extra-uterine gestation their course and termination are like those of an abdominal gestation.

Describe the course of pregnancy in the rudimentary cornu of a one-horned uterus. See fig. 28.

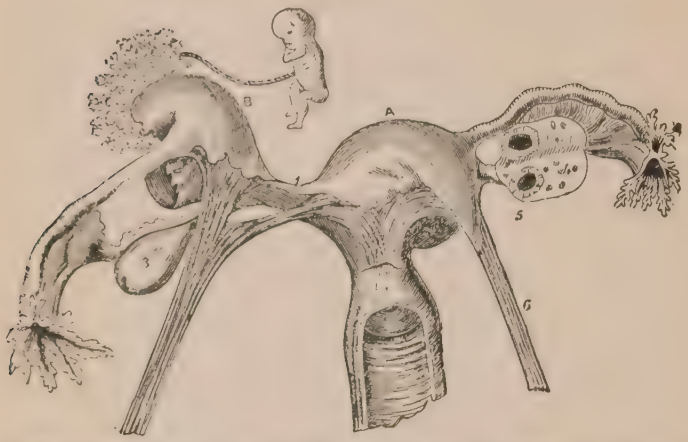
This variety is in close anatomical relation with the tubal form. Rupture, as a rule, takes place between the third and sixth months. The apex of the horn is the portion in which rupture takes place. In a case reported by Turner, pregnancy continued on to term. In a case cited by Kœberle, the fœtus died during the fifth month, and was formed into a lithopædion.

The formation of the placenta is more perfect in this variety of extra-uterine gestation.

Describe the course of abdominal pregnancy. See fig. 29.

This variety is divided into primary and secondary abdominal pregnancy. The former is very rare; the latter begins at first as one of the varieties of tubal pregnancy. The sac usually contains muscular fibres. The placenta may be attached to any of the abdominal or pelvic organs. Cases are on record of the ovum being free in the abdominal cavity, *i. e.*, not surrounded by pseudo-membranes. The pregnancy, in many cases, goes to term, when the fœtus dies and either becomes cartilaginous or is converted into a lithopædion or into adipocere; the ovum being retained for many months or even years. On the other hand, suppuration may

FIG. 28.



Gestation in rudimentary horn of uterus. *A*, developed right horn; *B*, rudimentary horn, with a rent through which the embryo had escaped; 1, right Fallopian tube; 2, left Fallopian tube; 3, left ovary; 4, 5, right ovary and corpus luteum; 6, round ligament.

FIG. 29.

Uterus and fœtus in a case of abdominal pregnancy.

occur, and the cyst rupture into the bowel or bladder, or discharge its contents through the abdominal wall.

Describe an ovarian pregnancy.

In this variety the fecundation and growth of the ovum take place within the ovisac. In some cases the ovum may pass through the opening caused by the rupture of the ovisac, and thus lie almost entirely within the abdominal cavity. In ovarian pregnancy rupture usually takes place in three or four months; rarely the gestation may go to term.

What are the symptoms of extra-uterine gestation?

It is convenient to divide the symptoms into three periods, as follows: 1, to the end of the fourth month, *i. e.*, up to the time when the sac usually ruptures; 2, from the fourth month to the completion of spurious labor; 3, from the completion of the labor to a period subsequent to the death of the fœtus (Parry).

First Period.—During the first six weeks the symptoms of intra-uterine pregnancy may be present, more or less modified. Menstruation usually ceases, the uterus enlarges up to a certain point, and a decidua is formed; a plug of mucus fills the cervix. The changes in the mammary glands occur; there is gastric irritability, and there is a deposit of pigment matter. The enlargement of the uterus is greatest in the interstitial variety. From the second to the fourth month severe intermittent pains occur in the hypogastrium. They are associated with great prostration or syncope; these symptoms may last for several hours or days. The pains are probably due to either a local peritonitis, to contractions of the uterus, or to stretching of adhesions. During this period frequent discharges of dark, clotted blood occur from the uterus; in some cases portions of the decidua are found mixed with the discharge. A vaginal examination, after the first six weeks, shows the uterus to be enlarged and displaced; usually forward, in some cases upward, or laterally. On the side, or behind the uterus, is felt a cystic tumor more or less tender to the touch. It is somewhat immovable, and in some cases ballottement and a feeling of obscure fluctuation can be detected.

Second Period.—The attacks of pain lessen in frequency or disappear. The bloody discharges from the uterus either cease

altogether or are greatly lessened. The movements of the fœtus are felt, generally on one side. The fœtal heart-sounds are distinctly heard, and the fœtus may be recognized by touch. The abdomen is perceptibly enlarged, more on one side of the median line than on the other. The uterus becomes fixed and displaced higher up. An examination per vaginam reveals a fluctuating tumor containing a solid which gives the sign of ballottement. In some cases the fœtus can be recognized. The tumor causes irritability of the bladder and rectum.

Third Period.—This period is characterized at full term by a spurious labor. The pains closely resemble those of the first stage of normal labor. After continuing for several hours or days they cease. Associated with the spurious labor there is a bloody discharge from the vagina containing, in some cases, portions of the decidua.

Fourth Period.—The death of the child follows the false labor. A few minutes prior to its death very active movements are observed. After the death of the child the liquor amnii is absorbed, and the abdomen lessens in size. This diminution in size continues and becomes permanent if decomposition does not take place. On the other hand, if decomposition occurs, symptoms of suppuration intervene.

If an extra-uterine pregnancy continues to the fourth or fifth month, what variety is it likely to be?

An abdominal or ovarian; it is almost certain not to be a tubal.

What are the symptoms of rupture of the cyst?

The patient complains of griping pains in the lower part of the hypogastrium, which are followed by a sudden pain of great severity; there is often a feeling as if something had ruptured inside the abdomen. These symptoms are followed by great prostration and collapse. Death rapidly ensues or the patient slowly recovers from the collapse, and peritonitis sooner or later follows.

What is the treatment of extra-uterine gestation?

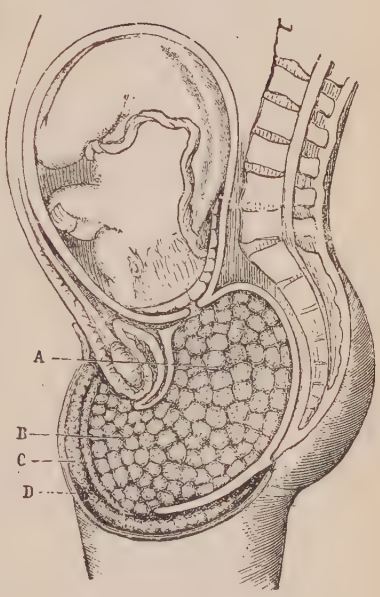
1. Methods to destroy the life of the embryo or fœtus.

Puncture.—This consists in evacuating the liquor amnii by puncturing the cyst with a trocar, introduced either through the

Fig. 30.

Diagram showing the unavoidable placental separation as a consequence of cervical dilatation.

Fig. 31.



Vaginal tampon in placenta prævia. *A*, deeply placed dossils to each of which a cord is attached; *B*, superficial dossils without cord; *C*, pledget of charpie or pad of cotton; *D*, T-bandage. (Bailly.)

rectum or vagina. The operation is not recommended on account of the great danger to the mother; cases are recorded where the pregnancy continued after the operation.

Injections into the Cyst.—This plan is both uncertain and dangerous. Morphia and atropia are the drugs usually employed.

Electricity.—This consists in the use of the faradic or galvanic current. It may be a successful method, but is objectionable on account of subsequent fœtal suppuration. One electrode is introduced into either the rectum or vagina, the other upon the abdominal wall. The treatment may be employed daily for from five to ten minutes, and continued until lessening in the size of the cyst indicates that the death of the fœtus has been accomplished.

2. The radical (operative) treatment. The only method advised.

The indications for abdominal section are summarized by J. Creig Smith, as follows:

(*a*) "In all cases before the period of expected tubal rupture ($2\frac{1}{2}$ to $3\frac{1}{2}$ months); in fact, as soon as the condition has been discovered."

(*b*) "In all cases of tubal rupture, as soon as possible after the condition has been diagnosed."

(*c*) "In all cases up to the fifth month in which the fœtus continues to live. Between the fifth month and the period of false labor, operation is not advisable."

(*d*) "In all cases after false labor when the child is dead and the amnion absorbed. If suppuration takes place, operation is imperative; if the fœtus is quiescent, operation, though advisable in the view of preventing further trouble, is not urgent. Absorption of the amnion is waited for, because this indicates cessation of circulation in the placenta."

(*e*) "In all cases where the condition endangers the life of the mother."

Placenta Prævia.

What is placenta prævia? See fig. 30.

The insertion of the placenta "to that part of the womb which always dilates as labor advances" (Rigby)—the lower segment.

What are the varieties of placenta prævia?

1. *Central*, in which the centre of the placenta is directly over the internal os uteri.

2. *Partial*, where there is more placental tissue on one side of the os internum than on the other.

3. *Marginal*, where the edge of the placenta reaches down to, but not over, the internal os uteri.

4. *Lateral*, where the edge of the placenta is near the os uteri.

How often does it occur?

Once in about 1200 cases.

What is the hemorrhage resulting from placenta prævia called?

Unavoidable hemorrhage.

What are the causes of placenta prævia?

Authorities do not agree as to the cause. The following are some of the theories:

The ovule does not become fecundated until it reaches the lower part of the cavity of the uterus; the impregnated ovum is not arrested in the upper part of the uterus on account of the mucous membrane not being sufficiently swollen; a deviation in the shape or size of the uterine cavity; uterine contractions may force the impregnated ovum down to the lower portion of the uterus; the oviducts may open near the internal os uteri; downward growth of the decidua.

It is more frequent in multiparæ than in primiparæ (six to one), and in the poor than in the rich; rapidly succeeding pregnancies and abortions also predispose to placenta prævia.

Describe the characteristics of the placenta.

It usually covers a larger surface of the uterine cavity than when normally implanted; it is thinner, and the cord is usually attached to the margin; occasionally it is velamentous. Prolapse of the cord frequently occurs during labor.

What is the characteristic symptom of placenta prævia?

Hemorrhage.—It rarely occurs before the last three months of pregnancy; Depaul limits the time in nearly all cases to the last month and a half. The hemorrhage is sudden, painless, without any evident cause, and is intermittent. The first hemorrhage is usually slight, but the amount of blood lost increases in each successive

attack. If the first attack of hemorrhage occurs near the end of pregnancy, it may be so profuse as to place the life of the patient in danger. Premature labor may occur after several attacks of hemorrhage.

What is the source of the hemorrhage? See fig. 30.

It results from a greater or less detachment of the placenta. The chief source of the hemorrhage is the uterine surface; a small amount of blood comes from the placental surface.

What are the causes of the hemorrhage?

This is an unsettled question; the following are some of the theories:

Rupture of the veins, due to the dilatation of the cervix (Portal and Giffard); in the latter months the cervix grows away from the placenta (Levret); the placenta develops more rapidly than the cervix (Stoltz and Barnes).

What is the prognosis of placenta prævia?

Grave in all cases to both mother and child. In general terms the maternal mortality is 30 to 40 per cent.; the fœtal from 75 to 80 per cent. The earlier in pregnancy the hemorrhage occurs, the greater the amount of blood lost, and the shorter the time between the attacks the graver the prognosis becomes. The great dangers after delivery are post-partum hemorrhage and septicæmia.

What is the diagnosis of placenta prævia?

It is impossible to recognize placenta prævia during the first half of pregnancy. If abortion occurs, the ovum is expelled without rupture of the membranes; there is absence of pain prior to the hemorrhage and at the time of expulsion.

During the second half of pregnancy, a hemorrhage coming on suddenly, and without any evident cause, should be looked upon as indicative.

On examination per vaginam the vault of the vagina feels soft and doughy, and in some cases, where the insertion of the placenta is not central, it will be found thicker on one side than on the other; ballottement cannot be demonstrated; the cervix is patulous, elongated, and softened, and occasionally its vessels can be

felt pulsating. The diagnosis is not positive unless the placenta can be felt through the os.

What is the treatment of placenta prævia? See fig. 31.

If the hemorrhage occurs prior to the viability of the fœtus, and it does not endanger the mother's life, Parvin and Playfair advise the expectant plan of treatment. If, however, the hemorrhage is grave, then the pregnancy must be ended. Lusk, on the other hand, holds that the pregnancy should be ended if the hemorrhage occurs prior to viability, whether it be slight or profuse. After the viability of the fœtus all authorities now agree that the induction of premature labor is indicated.

The expectant plan of treatment employed prior to the viability of the fœtus consists in absolute rest in bed, cold drinks, and the use of opium if the patient is restless or suffers pain.

The nurse should be instructed in the use of the tampon, in order to prevent loss of blood, if a sudden and grave hemorrhage occurs.

In the treatment of placenta prævia by the induction of premature labor the chief indication to be met during dilatation of the cervix is the management of hemorrhage.

If the cervix is rigid and undilated, the tampon should be employed. The tampon assists in the dilatation of the cervix and increases the force of uterine contractions; it also serves as a plug to control the hemorrhage. The tampon should be removed at the end of four hours, according to Lusk; Parvin holds that "it is doubtful if any harm will result should a properly applied antiseptic tampon be left for twenty-four hours." If the cervix is found to be sufficiently dilated after the removal of the tampon, the operator may use either Barnes's dilators or turn by Braxton Hicks's bimanual method.

If the former be decided upon, the complete dilatation of the cervix is accomplished by the introduction of Barnes's rubber bags. The dilator of Barnes acts not only as a plug in the os uteri, but it rapidly causes complete dilatation of the cervix.

After the cervix has been dilated the membranes should be ruptured and the case left to nature, if the attachment of the placenta is not central, if the contractions of the uterus are strong,

and if the presentation is favorable. If the uterine contractions are weak, small doses of ergot should be given. The general indications for the use of the forceps hold good. If the child's head is movable and does not exert sufficient pressure to control the hemorrhage, version should be performed.

If the implantation be central, the placenta should be separated with the finger from around the cervix. Barnes's dilators should then be introduced, and the dilatation of the cervix completed. While the dilators are being used perform pelvic version by the external method. If this cannot be accomplished, wait until the cervix is dilated, and then perform podalic version.

In order to save fœtal life rapid dilatation of the cervix must be performed, followed by perforation of the membranes, and delivery of the fœtus by podalic version.

The after-treatment consists in guarding against post-partum hemorrhage; ergot should be given for a week or longer. Strict antiseptic measures must be adopted before and after delivery.

Accidental Hemorrhage.

What is accidental hemorrhage?

Hemorrhage from the separation of a normally situated placenta.

How is it divided?

Into open and concealed hemorrhage.

Concealed hemorrhage occurs, according to Goodell, "(*a*) when the placenta is centrally detached, and the blood accumulates in the cul-de-sac formed by the firm adhesion of its margins to the uterine walls. (*b*) When the placenta is so detached that the blood escapes into the uterine cavity behind the membranes near the fundus. (*c*) When the membranes are ruptured near the detached placenta and the effused blood mingles with the liquor amnii. (*d*) When the presenting part of the fœtus so accurately plugs up the maternal outlet that no existing hemorrhage escapes externally" (Lusk).

What are the causes of accidental hemorrhage?

It usually occurs in multiparæ, especially in the weak and sickly.

It may be caused by inflammation of the kidneys (acute or chronic), by anæmia, or by placental disease. It is usually caused by prolongation of pregnancy beyond term, violent exercise, or accidents; or by uterine contractions, or emotional influences. Certain acute diseases have also been given as causes.

What are the symptoms?

Extreme collapse and severe pain, absence or great feebleness of the pains of labor, distinct enlargement of the uterus, or occasionally a localized distention of the uterine walls. A discharge of pure blood or blood mixed with liquor amnii.

In the concealed variety the diagnosis is made from the foregoing symptoms.

Accidental hemorrhage may be mistaken for rupture of the uterus. Rupture of the uterus, however, occurs after the escape of the liquor amnii, and is followed by the recession of the presenting part and the escape of more or less of the fœtus into the abdominal cavity.

What is the prognosis?

Unfavorable for both mother and child. The prognosis is more favorable in the open variety.

What is the treatment?

Whether the hemorrhage be grave or slight, immediate delivery must be accomplished by forceps or version. Rupture the membranes and give ergot. If the os be sufficiently dilated, deliver by forceps or podalic version; Barnes's dilators should be used if the cervix is undilated. Firm compression should be made upon the uterus.

Eclampsia.

Define eclampsia.

"An acute disease coming on during pregnancy, labor, or the puerperal state, and characterized by a series of tonic and clonic convulsions, affecting at first the voluntary muscles, and, finally, extending to the involuntary, accompanied by a complete loss of

consciousness, and ending by a period of coma or sleep, which may result in cure or death" (Charpentier).

What is the frequency of eclampsia?

Parvin places the proportion as 1 to 250 or 300 pregnancies; Lusk, 1 to 500.

The disease is more frequent in pregnancy or in labor, than in the puerperal state. It is most frequent in the latter months of pregnancy.

What is the etiology of eclampsia?

The etiology of the disease is still an unsettled question. The following theories have been advanced:

1. Cerebro-spinal congestion.
2. General or cerebral anæmia.
3. Anæmia of the cerebro-spinal centres, with congestion of the meninges.
4. Eclampsia is a neurosis.
5. Eclampsia depends upon a poisoning of the blood, which renders it unfit to act normally upon the nervous centres.
   (*a*) Albumen.
   (*b*) Urea.
   (*c*) Carbonate of ammonia.
   (*d*) Extractive matters (creatin, creatinin, leucin, etc.).
   (*e*) Soluble toxic ptomaines.

How are the symptoms of eclampsia classified?

Into the premonitory symptoms and the symptoms of the attack; the latter is subdivided into three periods as follows:

1, Invasion; 2, tonic convulsions; 3, clonic convulsions.

What are the premonitory symptoms?

The most constant symptoms are headache, disturbance of vision, and epigastric pain. Among other symptoms may be mentioned somnolence or insomnia, excitement, vertigo, vomiting, and despondency.

What are the symptoms of the attack?

Period of Invasion.—Suddenly the eyes become fixed and then follows a short period of quiet. The attack then commences by

rapid movements of the eyelids, and of the alæ of the nose, followed by convulsive twitchings of the muscles of the face. The pupils are dilated and insensible to light, the mouth deviates toward the left side, and the head rotates from one side to the other.

Period of Tonic Convulsions.—The convulsive movements extend from the head to the neck, body, and, finally, to the extremities. The body becomes rigid, the back is strongly arched, and the patient rests upon the bed by the head and lower extremities (opisthotonos). The arms are extended and rigid; the hands are closed, and the thumbs are flexed upon the palms. The tonic spasms involve the diaphragm and muscles of the thorax, respiration ceasing; the face becomes red and swollen; the tongue is thrust partially out of the mouth; the saliva becomes frothy and mixed with blood, due to the tongue being bitten by the teeth. When respiration becomes reëstablished, the air passes out with a whistling noise. There is complete loss of sensation and consciousness. The stage of tonic convulsions lasts from ten to twenty seconds.

Period of Clonic Convulsions.—The convulsions begin in the muscles of the face and extend to the body and extremities. The face becomes deeply congested and horribly contorted; the jaws open and close rapidly; the tongue may again become bitten; the respiration is irregular and noisy; the saliva becomes frothy and mixed with blood. As a rule, the convulsions do not cause a change in the position of the patient. In some cases, however, it is necessary to use force to keep the woman in bed. This period lasts from one to two minutes, and is followed by coma or stupor. At the end of half an hour, in most cases, sensation and consciousness gradually return.

As a rule, the attack is followed by others; the interval in some cases may be only a few minutes, or it may be several hours. In rare cases there is only one attack, which is followed by the rapid recovery of the patient.

What is the prognosis?

The prognosis is grave. The maternal mortality is 30 per cent.; the fœtal 50 per cent. Eclampsia predisposes to post-partum hemorrhage and inflammations during the puerperal state.

What conditions would lead to a favorable prognosis?

The attacks infrequent and mild, recovery of consciousness in the intervals, small amount of albumen and urates in the urine, steady fall of the temperature, and the later in pregnancy or labor the attacks occur.

What conditions would lead to an unfavorable prognosis?

The uterus remaining long unemptied, the attacks frequent and severe, and occurring early in pregnancy or labor, the coma profound, the urine scanty and containing a large amount of albumen and urates, and the temperature high.

How is the treatment divided?

Into 1. Prophylactic; 2. Curative; 3. Obstetric.

Describe the treatment of eclampsia.

Prophylactic.—This treatment consists in a milk diet, saline cathartics, and hot baths. If the quantity of albumen be large, the diet should be entirely of milk. The saline cathartic should be given every other morning. On the morning the cathartic is not given, the patient should take a hot bath, the temperature of which should be from 98° to 100°F. The patient should remain in the water fifteen minutes, and upon coming out should be dried and wrapped in a warm blanket and given hot milk or hot water to drink.

Lusk advises the tincture of the chloride of iron in full doses, for its diuretic and tonic effect. If the symptoms indicate that an attack is imminent, thirty grains each of chloral and the bromide of potassium should be given per rectum. A hydragogue cathartic should be administered to unload the bowel. The pressure upon the ureters and upon the renal vessels may be relieved by assuming the knee-chest position several times a day. The patient should avoid lying upon her back. Parvin advises "moderate bleeding" in cases in which the urgency of the symptoms will not admit of waiting for the action of prophylactic measures.

Playfair advises small doses of the tincture of digitalis along with the tincture of the chloride of iron.

The milk diet should be continued so long as the urine contains albumen. The urine should be examined daily in bad cases.

If no albumen has been found in the urine for eight days, Charpentier advises the following tonic:

℞.—Extract. quiniæ, extract. gentianæ, āā ʒij; Ferri subcarbonatis, gr. xv; Pulv. rhei, q. s.—M. Ft. pil. No. 100. Sig.—Take five or six pills during the day.

Curative.—The patient should have her clothing loose; she should be watched to prevent her from falling out of bed—her movement, however, should not be restricted; and a folded napkin should be placed between the teeth to prevent the tongue from being bitten.

The bowels should be freely acted upon by the compound powder of jalap, elaterium, calomel, or one or two drops of croton oil placed upon the back part of the tongue; a stimulating injection should also be given per rectum. Hypodermoclysis, or the rectal injection of salt-solution, is valuable in all cases.

Chloroform should be given by inhalation and at the same time thirty to forty grains of chloral injected into the rectum ("in the yelk of an egg and six ounces of milk"). The chloroform should be given in full doses during the convulsions; at the approach of another paroxysm the amount should be again increased. It may be necessary to repeat the chloral in an hour or two.

The advantages of venesection are disputed. Lusk advises from eight to sixteen ounces of blood to be withdrawn as "the first step in the treatment of convulsions." Parvin holds that "bleeding ought not to be regarded as universally applicable."

Morphia, hypodermatically, is advised by some. Lusk gives from one-sixth to one-quarter of a grain, repeating the dose in an hour, if there is a return of the convulsions. He also combines bromide of potassium along with chloral in rectal injections; giving thirty grains of each at a dose.

Excellent results follow the employment of heroic doses of veratrum viride (fl. ext. or tinct.): 15 minims are injected hypodermatically, and 5 minims more injected when the pulse rises above 60.

Obstetric.—If the uterus be emptied, the convulsions cease in about one-third of the cases. During the first stage, if the pains are weak, a catheter should be carefully introduced into the uterus. The dilators of Barnes, if required, should be used to dilate the cervix. After the complete dilatation of the os, the forceps should

be applied and the child delivered. Artificial means to hasten labor should only be employed in those cases in which there is a clear indication.

When eclampsia occurs during pregnancy, Parvin and Lusk advise the induction of premature labor.

If convulsions begin or continue after delivery, chloral, or morphia, and chloroform should be used. Lusk does not believe in the use of chloroform in the treatment of eclampsia during the puerperal state.

LABOR.

What is labor?

"Labor is the physiological end of pregnancy, and may be defined as the process by which the fœtus and its appendages are separated from the mother; it is travail, bringing forth" (Parvin).

How is labor classified?

Into: 1. *Premature*, where labor occurs after the fœtus is viable and before full term.

2. *Postponed*, where labor occurs after full term; the fœtus being alive.

3. *Missed*, where labor occurs after full term; the fœtus being dead.

4. *Natural*, where labor takes place without the assistance of art.

5. *Artificial*, where nature is aided, or replaced by art.

What are the conditions necessary for a natural labor?

1. *Fœtus.*—The size must not be larger than normal, and the presentation must be favorable.

2. *Mother.*—The parturient canal and the voluntary and involuntary forces must be normal.

What are the determining causes of labor?

This question is as yet unsettled; the various theories may be found in the text-books.

What are the efficient causes of labor?

The contractions of the uterus, assisted during the second stage of labor by the abdominal muscles.

What are the precursory symptoms of labor?

(*a*) *Sinking of the Uterus.*—This is the descent of the fœtal head enclosed by the lower portion of the uterus into the cavity of the pelvis. The waist of the patient becomes smaller, respiration less difficult, and the pressure upon the stomach is relieved. On account of the pelvic organs being pressed upon, the bladder and rectum become irritable; there is difficulty in locomotion, and the œdema of the lower limbs is increased. The sinking of the uterus is more frequent in the primigravida than in the multigravida; in the latter, the uterus is more inclined to become anteverted. Descent of the uterus generally occurs from two to four weeks prior to labor; in some cases only one or two days, in others, one month. This phenomenon indicates that the presentation and size of the pelvis are normal.

(*b*) *Secretions from the Cervical Glands.*—A profuse glairy secretion takes place from the glands of the cervix. As labor approaches, it becomes mixed with blood, and is known as the "show." The blood indicates that a partial detachment of the decidua near the cervix has taken place. A profuse discharge indicates that the cervix will dilate rapidly.

(*c*) *Changes in the Vagina and External Organs.*—The external genitalia are swollen and covered by a copious secretion; the labia majora are separated; and the vagina becomes moist and relaxed.

(*d*) *Painless Uterine Contractions.*—These become more frequent. They cause little or no discomfort in the primiparæ, while in the multiparæ they may become painful several days before labor.

What are the conditions which indicate that labor has begun?

Effacement and dilatation of the cervix, with regularly recurring uterine contractions.

Into how many stages is labor divided?

Three. *First stage*, or "*uterine period*," ends with the complete dilatation of the cervix; *second stage*, or "*utero-abdominal period*," begins after complete dilatation of the cervix, and ends with the expulsion of the child; *third stage*, or "*placental period*," includes the detachment and expulsion of the placenta.

How are the phenomena of labor divided?

Into the physiological, plastic, and mechanical phenomena.

What are the "characteristics of uterine force"?

1. *Involuntary.*

2. *Intermittent.*

3. *Peristaltic.* The peristaltic wave begins at the fundus of the uterus; the movements are so rapid that practically the contractions of the uterus are simultaneous.

4. *Form changes.* During the intervals of uterine contraction the uterus is ovoid in shape. During contraction the transverse diameter is shortened, while the antero-posterior and longitudinal are somewhat elongated. The modifications in the diameters cause the uterus to become more or less cylindrical in shape.

5. *Changes in position.* The broad and round ligaments contracting press the uterus against the brim of the pelvis; the latter also incline the organ anteriorly.

6. "*The power of the contractions* is in proportion to their frequency and resistance."

7. *The regularity and force of the contractions* depend upon the presentation of the fœtus—*e. g.*, in presentation of the vertex they are more regular than in the other presentations.

8. *The contractions are painful.* The character of the pain varies with the stages of labor. The pains are very severe in some women, while others suffer but little. The contractions of the uterus begin before pain is recognized by the patient, and continue after all suffering has ceased.

What are the character, situation, and cause of the pains during the first and second stages of labor?

First Stage.—The patient speaks of the pains as "acute," or "grinding," or "cutting." The pains begin in the lumbo-sacral region and extend to the pubes, from whence they radiate down the thighs. The pains are caused by the dilatation of the cervix and the compression of the uterine nerves, produced by the contractions of the uterus.

Second Stage.—The pains give a sensation of stretching or tearing. The patient speaks of them as "bearing-down pains."

The abdominal muscles are now brought into play, adding by their contractions to the pain felt by the patient. There is an intense sense of tearing apart of the vulvo-vaginal canal and perineum; cramps occur in the legs; and there is a sensation of tenesmus in the rectum. The pressure exerted by the fœtus upon the nerves and organs of the pelvis and the stretching of the pelvic soft parts, are the obvious causes of the pains.

Describe the process by which the cervix is dilated. Fig. 32.

At the beginning of labor the cervix is effaced, and the border of the os uteri is felt as a slight projection; it is more distinct in multiparæ than in primiparæ. As the os dilates, the uterine cavity decreases in size, and the action of the muscular fibres of the body of the uterus draws the cervix up over the advancing part of the fœtus. At the beginning of a uterine contraction, the cervix becomes "thicker, irregular, as if puckered," and the os decreases in size; later, however, the cervix becomes thin, and the os increases in size. As dilatation of the cervix advances, the decrease in the size of the os does not take place at the beginning of a contraction.

In primiparæ the cervix is very thin in the beginning of dilatation. The margins of the cervix feel like a thick thread. As dilatation advances, the cervix becomes thick and œdematous, especially the anterior portion. Dilatation of the cervix is more rapid in multiparæ than in primiparæ. As the second stage advances, the dilatation is more rapid than in the beginning. As labor advances, the cervix no longer points posteriorly and toward the left, but it assumes a more central position. The shape of the os is round at first; later it becomes oval.

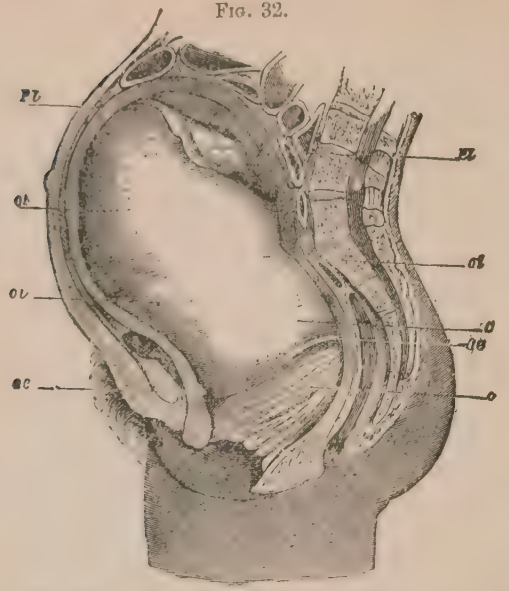
The following is the mechanism of the dilatation of the cervix:

1. The longitudinal muscular fibres of the body and fundus of the uterus overcome the action of the circular fibres of the cervix, and tend to pull it open.

2. The pressure of the membranes and the presenting part mechanically dilates the cervix.

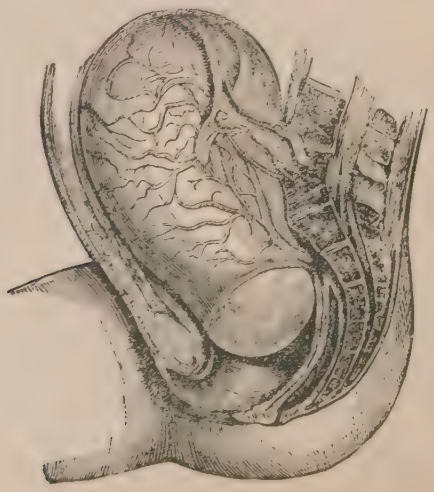
3. The uterine contractions are stimulated by the pressure of the ovum upon the cervix.

FIG. 32.



Vertical section through the genital canal showing the dilatation of the cervix. *Pl*, placenta; *ol*, orifice of the tube; *oi*, internal os; *C*, cervix; *oe*, external os; *v*, vagina.

FIG. 33.



The bag of waters.

What is the bag of waters? See fig. 33.

The fœtal membranes, enclosing the liquor amnii, projecting through the os uteri. The size and form of the bag of waters depend upon the presentation of the fœtus and upon the extent of the dilatation of the os. The bag of waters is small in a vertex presentation; it has at first the shape of the crystal of a watch, but later it becomes hemispherical. In all the other presentations it is large, on account of the amount of liquor amnii in advance of the fœtus. The bag of waters usually ruptures at the time of complete dilatation of the cervix. When rupture occurs at the end of pregnancy or in the beginning of the first stage, the labor is spoken of as a "dry labor." In catarrhal endometritis there is a collection of fluid which may be discharged before labor; this discharge is spoken of as the "false waters."

What is the diagnosis of the rupture of the bag of waters?

Intact.—During contractions: The bag of water is tense and smooth. The liquor amnii is felt in advance of the presenting part. *Intervals between contractions:* The bag of waters is flaccid, and can be pressed into wrinkles.

Ruptured.—During contractions: The scalp becomes wrinkled. No fore-waters. *Intervals between contractions:* The scalp gives a different sensation to the examining finger, and it cannot be pressed into wrinkles. By inserting the finger between the head and the uterus the liquor amnii will escape into the palm of the hand.

Describe the action of the abdominal muscles.

These muscles assist the uterus in the expulsion of the fœtus. They are not brought into play until the end of the first stage of labor. Their action is voluntary, and remains so until the head is being expelled from the vulva, when the patient loses all control, and reflex action takes the place of voluntary effort.

Describe the dilatation of the vagina and perineum.

The vagina is dilated by the descent of the presenting part, and offers but little resistance, except at its orifice. At this point the head may be delayed several hours.

The contractions of the muscular fibres of the vagina assist in the delivery of the body after the escape of the head.

The perineum becomes slowly distended by the presenting part until it measures several inches in length.

At each contraction the head advances, but it recedes again in the interval of utero-abdominal effort. The stretching of the perineum by the advancing head causes the anus to gape wide open and expose the anterior wall of the rectum. The head advances and then recedes until the parietal protuberances escape from the vulva, when it becomes fixed. A strong contraction almost immediately follows and the head is born; the perineum passing over, first, the anterior fontanelle, then the forehead, and lastly, the face of the child. After the birth of the head a short interval of rest follows, when contractions again come on, and the body of the child is expelled, followed by a discharge of liquor amnii mixed with blood.

How long after the birth of the child is the placenta expelled?

Usually in from ten to twenty minutes.

How is hemorrhage prevented after the detachment of the placenta?

By the blood becoming clotted in the mouths of the vessels, but chiefly by uterine retraction, which causes the muscular fibres of the uterus to act as "living ligatures."

How is the placenta detached and expelled from the uterus?

It is detached by uterine retraction, and expelled by uterine contractions, assisted by voluntary efforts.

The detachment of the placenta occurs "almost simultaneously in all parts."

Playfair agrees with Duncan that the placenta presents by its edge at the mouth of the uterus; the general view is that the fœtal surface presents, and that it is folded upon itself. Parvin is of the opinion that, in all probability, the part which presents depends

upon the part of the uterus to which the placenta was attached, "and upon whether the membranes are separated before the uterine contractions which expel it begin."

What are the effects of labor on the mother and fœtus?

Mother.—During a uterine contraction the arterial pressure is increased, and the pulse becomes more rapid; in the interval of pain the pulse declines again to its normal condition. During the pains the respirations become slower; but they become more rapid in the intervals. As labor advances there is a slight progressive rise in the temperature. The urine is increased in amount. Vomiting may occur during the first stage; it has no significance. If, however, it occurs during the second stage, and is associated with weak uterine contractions and exhaustion, immediate delivery is indicated.

In some patients a "slight shivering" occurs at the beginning of a uterine contraction. In the intervals of uterine contractions patients have a tendency to sleep, this results from fatigue, and also from cerebral congestion.

Fœtus.—There is a slight increase in the rapidity of the fœtal heart at the beginning of a uterine contraction; it becomes slower during the height of a contraction, and after the pain passes off it becomes more rapid than normal for a short length of time. Discharges of urine and meconium are caused by pressure upon the fœtus; a discharge of meconium is usual in breech presentations, but rare in vertex presentations.

What is the duration of labor?

In primiparæ the average is seventeen hours; in multiparæ twelve hours. As a rule, the second stage is one-third that of the first stage. Labor usually begins between the hours of 9 and 12 o'clock at night, and ends between 9 o'clock in the evening and the same hour in the morning.

What are the causes of false labor-pains?

Intestinal irritation, rheumatism of the uterus, and contractions of the uterine and abdominal muscles; the first is the most frequent cause.

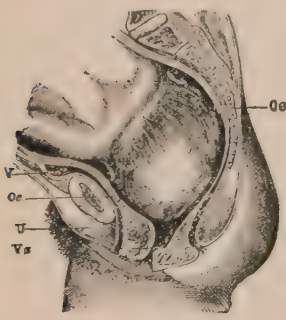
What is the diagnosis of false from true labor-pains?

True Pains.	*False Pains.*
Premonitory symptoms of labor.	No premonitory symptoms.
Begin in the lumbo-sacral region and extend to the pubes.	Felt at all parts of the abdomen.
Regular in recurrence.	Irregular.
Increase in severity.	No increase in severity.
Dilatation of the cervix.	No dilatation.
Effacement of the neck.	No effacement.

What do you mean by the plastic phenomena of labor?

"The fœtal form-changes produced in labor, and dependent upon presentation and position" (Parvin). The alterations in the diameters of the fœtal head have already been discussed.

FIG. 34.



Formation of the caput succedaneum.

What is the caput succedaneum? See fig. 34.

A swelling upon the presenting part of the fœtus, due to a sero-sanguineous infiltration, the result of lack of pressure. The infiltration occurs upon that portion of the presenting part not subjected to pressure. The size of the tumor depends upon the length of the labor; in rapid deliveries it is but little developed. The caput succedaneum is violet-colored; it pits on pressure, but does not fluctuate.

What is the situation of the caput succedaneum in the various presentations?

Vertex.—L. O. A., on the posterior and superior angle of the right occipital bone.

R. O. A., on the posterior and superior angle of the left occipital bone.

L. O. P., on the superior and anterior angle of the right occipital bone.

R. O. P., on the superior and anterior angle of the left occipital bone.

Face.—Fronto-anterior positions, on the superior portion of the malar region, and, in some cases, upon the eye.

Fronto-posterior positions, on the superior portion of the malar region and upon the side of the mouth.

Breech.—As a rule, upon the anterior thigh; it may also include the external genitals.

Shoulder.—Upon the presenting shoulder.

Mechanism of Labor.

What do you mean by the mechanical phenomena of labor?

"The passive movements given the fœtus in its expulsion." (Parvin.)

How many presentations of the fœtus are given? Fig. 35.

Five: 1. The vertex.
2. The face.
3. The breech.
4. The right shoulder.
5. The left shoulder.

FIG. 35.

Vertex presentation.

How many positions are given for the vertex, face, and breech?

Four each: 1. Left anterior.
2. Right anterior.
3. Right posterior
4. Left posterior.

How many positions are given for each of the shoulders?

Two: An anterior and posterior position.

What is meant by presentation? See fig. 36.

"That part of the fœtus which is in relation with the pelvic inlet" (Parvin); or "That portion of the fœtus which occupies the lower segment of the uterus" (Lusk).

What is meant by position?

"The relation which the presenting parts of the fœtus have to certain fixed points of the inlet" (Parvin). These fixed points are the four cardinal points of Capuron; anteriorly, the ilio-pectineal eminences; posteriorly, the sacro-iliac joints. The positions of the shoulder have no relation to these points on the inlet.

By what methods can the diagnosis of presentation and position be made?

By abdominal palpation, auscultation, and vaginal touch or indigation.

How is the diagnosis of presentations made by auscultation?

The uterus is divided into four parts by a transverse and a perpendicular line. The former divides the uterus into two equal parts; the latter corresponds with the median line of the abdomen, and extends from the ensiform cartilage to the pubes. As the umbilicus is not the same distance above the pubes in all cases, the transverse line may or may not pass through it.

The maximum of intensity of the fœtal heart sounds is heard as follows:

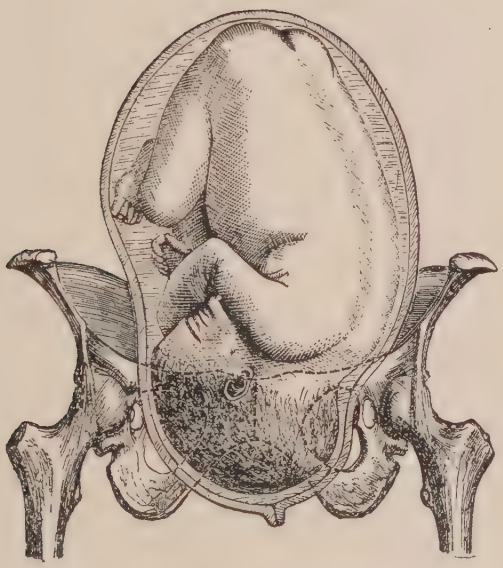
Vertex Presentations.—Below the transverse line and to the right or left of the perpendicular line.

Face Presentations.—On the transverse line and to the right or left of the perpendicular line.

Breech Presentations.—Above the transverse line and to the right or left of the perpendicular line.

Shoulder Presentations.—On the perpendicular line, midway between its point of intersection with the transverse line and the pubes.

Fig. 36.



Vertex presentation; child surrounded by amniotic fluid. (Pinard.)

How is the diagnosis of positions made by auscultation?

The maximum of intensity of the fetal heart sounds is heard as follows:

Vertex.

L. O. A. Midway on a line extending from the left ilio-pectineal eminence to the point of intersection of the transverse and perpendicular lines.

R. O. A. At the same point on the right side.

R. O. P. Midway on a line extending from the right sacro-iliac joint to the point of intersection of the transverse and perpendicular lines.

L. O. P. At the same point on the left side.

Face.

L. F. A. On the transverse line and to the right of the perpendicular line.

R. F. A. On the transverse line and to the left of the perpendicular line.

R. F. P. On the transverse line and to the left of the perpendicular line.

L. F. P. On the transverse line and to the right of the perpendicular line.

Breech.

L. S. A. At a point near the perpendicular line on a line extending from the middle of last left false rib to the intersection of the transverse and perpendicular lines.

R. S. A. At the same point on the right side.

R. S. P. On the same line and on the same side as in R. S. A., but at a point further from the perpendicular line.

L. S. P. On the same line and on the same side as in L. S. A., but at a point further from the perpendicular line.

Shoulder.

The shoulder presenting and its position cannot be diagnosed by auscultation. Auscultation gives only one point of maximum intensity, namely, on the perpendicular line midway between its point of intersection with the transverse line and the pubes.

What is meant by the lie of the fœtus?

The relation of the longitudinal axis of the fœtus with the longitudinal axis of the uterus.

If the longitudinal axis of the fœtus corresponds with the longitudinal axis of the uterus, we know that the presentation is either a vertex, face, or breech. On the other hand, if the axis of the fœtus is oblique in its relation with the uterus, we know that a shoulder is presenting.

How is the fœtal head recognized by palpation?

By its being hard, round, uniform in shape, and more or less movable.

How is the breech recognized by palpation?

It is felt as a prominent body, broader than the head; it is less round and hard and lacks the same uniform shape of the head; it is also immovable—*i. e.*, it cannot be moved without displacing the body of the fœtus. Little mobile objects are felt near it, which are the lower extremities of the fœtus.

How is the back recognized by palpation?

It is felt as a resisting, expanded mass, which connects the head with the breech.

How is the diagnosis of presentations made by palpation?

First find the lie of the fœtus, then where the head and breech are, and, lastly, differentiate, if the head presents, between the vertex and face.

Vertex. — The lie of the fœtus is longitudinal; the head is in the lower segment of the uterus, and the breech in the upper part.

Now with the head in the lower segment of the uterus, and the breech in the upper, we have either a presentation of the vertex or face. First find whether the back is anterior or posterior, and then toward which side of the pelvis it points. If the back is anterior and toward the left we know that the position must be left anterior. If it be a vertex presentation, the head will be found

occupying the pelvic cavity. Again, the hand will sink deeper into the left side of the pelvis than into the right; the forehead being on the right side offers a resistance. Furthermore, the occiput will be found to be continuous with the back and not separated from it by a deep furrow as would be the case in a face presentation.

Face.—The lie of the fœtus is longitudinal; the head is in the lower segment of the uterus, and the breech in the upper part. If the back is anterior and toward the left, the hand will sink deeper into the right side of the pelvis, on account of the left side being occupied by the forehead. Again, the head will be found, if labor has not begun, above the inlet, not low down and occupying the pelvic cavity, as it does in a vertex presentation. In some cases the inferior maxillary bone may be felt; it resembles a horseshoe-like swelling. Furthermore, a deep furrow is felt between the occiput and the back of the fœtus. In a face presentation the fœtal heart-sounds are heard on the opposite side of the perpendicular line and not on the side toward which the back is presenting. This is not so in a vertex or breech presentation, and this disagreement between palpation and auscultation should suggest to the practitioner the existence of a face presentation.

Breech.—The lie of the fœtus is longitudinal; the breech is in the lower segment of the uterus and the head in the upper part.

The presenting part is found above the superior strait and the pelvic cavity empty. Again, the fœtal members are felt near the breech in the lower segment of the uterus. Furthermore, the head, which is in the upper part of the uterus, is found to be freely movable.

Shoulder.—The lie of the fœtus is oblique; the head occupies one of the iliac fossæ while the breech is on the opposite side. The head is lower than the breech, and the presenting shoulder is generally in the plane of the inlet. The pelvic cavity is found to be empty, as is also the case in a face or breech presentation. It is possible to perform cephalic ballottement. Furthermore, the shape of the abdomen is changed, being increased in its transverse diameter. The fœtus is not placed in a transverse position—*i. e.*, the head does not occupy one iliac fossa, while the

breech occupies the other. As the length of the fœtus is greater than the distance between the iliac fossæ, its position is oblique, not transverse.

How is the diagnosis of positions made by palpation ?

Vertex.

L. O. A. The back is found anterior and toward the left, and the hand sinks deeper into the left side of the pelvis than into the right.

R. O. A. The back is found anterior and toward the right, and the hand sinks deeper into the right side of the pelvis than into the left.

R. O. P. The anterior plane of the fœtus is toward the front of the mother, and the fœtal members are readily felt. The resistance of the body of the fœtus is felt on the right side, but more to the right and further back than in a R. O. A. position. The resisting surface felt is the left side of the body of the fœtus. Rotating the woman over on to her left side, the abdomen resting upon the bed, we can map out the back of the fœtus, and find that it is directed toward the right sacro-iliac joint. Again, the hand sinks deeper into the right side of the pelvic cavity than into the left.

L. O. P. The anterior plane of the fœtus is toward the front of the mother, and the fœtal members are readily felt. The resistance of the body of the fœtus is felt on the left side, but more to the left and further back than in a L. O. A. position. The resisting surface felt is the right side of the body of the fœtus. Rotating the woman over on to her right side, the abdomen resting upon the bed, we can map out the back of the fœtus, and find that it is directed toward the left sacro-iliac joint. Again, the hand sinks deeper into the left side of the pelvic cavity than into the right.

Face.

L. F. A. The back is found anterior and toward the left, and the hand sinks deeper into the right side of the pelvic cavity than into the left.

R. F. A. The back is found anterior and toward the right, and

the hand sinks deeper into the left side of the pelvis than into the right.

R. F. P. and L. F. P. The diagnosis of these positions is made in the same manner as in R. O. P. and L. O. P. positions.

Breech.

L. S. A. The breech is in the lower segment of the uterus, with the back of the fœtus anterior and toward the left side of the mother's pelvis.

R. S. A. The breech is in the lower segment, with the back of the fœtus anterior and toward the right side of the mother's pelvis.

R. S. P. The anterior plane of the fœtus is toward the mother's front, the back toward the right sacro-iliac joint.

L. S. P. The anterior plane of the fœtus is toward the mother's front, the back toward the left sacro-iliac joint.

In making a diagnosis of the posterior positions of the breech by palpation the woman should be rotated upon one or the other side, so as to determine the direction of the back.

Shoulder.

L. D. A. The head will be found in the right iliac fossa, and the breech on the left side higher up. The back will be anterior.

R. D. A. The head will be found in the left iliac fossa, and the breech on the right side higher up. The back will be anterior.

R. D. P. The head will be found in the right iliac fossa, and the breech on the left side higher up. The anterior plane of the fœtus and its members are found toward the front of the mother.

L. D. P. The head will be found in the left iliac fossa, and the breech on the right side higher up. The anterior plane of the fœtus and its members are found toward the front of the mother.

If the head is on the right side of the mother's pelvis, the position is either a L. D. A. or R. D. P. If the back is anterior it is the former, if posterior the latter. Again, if the head is on the left side of the pelvis, the position is either a R. D. A. or L. D. P. If the back is anterior it is the former, if posterior the latter.

How is the diagnosis of presentations made by vaginal touch or indigation?

The diagnosis by indigation is practically a description of the surface anatomy of the part presenting.

Vertex.

Before Labor.—The finger feels a hard, round body enclosed in the lower portion of the uterus. If the lower segment of the uterus is thin, the sutures and fontanelles may be recognized.

During Labor.—(*a*) *Before rupture of the bag of waters.* Vaginal touch should be employed in the interval between pains. The head is felt and recognized by the sutures and fontanelles. If the head is high up and movable, pressure upon the hypogastrium will cause it to become fixed and more accessible. If indigation be employed during a contraction, the size and shape of the bag of waters will assist in the diagnosis.

(*b*) *After rupture of the bag of waters.* If the examination be made immediately after the rupture, the sutures and fontanelles are easily recognized. On the other hand, if the examination be delayed, the formation of the caput succedaneum will render the diagnosis more difficult. Under these circumstances if the finger be carried beyond the tumor on the head, the sutures and fontanelles may be felt.

Face.

Before Rupture of the Bag of Waters.—The diagnosis is difficult. Early in labor the forehead may be mistaken for the vertex. We feel the anterior fontanelle and may mistake the fronto-parietal suture for the sagittal. If it be a vertex presentation, and we take the anterior fontanelle as the starting-point, and follow the sagittal suture posteriorly we find that it ends at the posterior fontanelle. On the other hand, if the face presents, the sagittal suture ends at the root of the nose and superciliary ridges.

After Rupture of the Bag of Waters.—The diagnosis is easy. On one side of the pelvis we recognize the forehead, a hard, round body, also the fronto-parietal suture, terminating at the anterior fontanelle. Below the forehead are the superciliary ridges, and the projection of the eyeballs. Further we feel the nose and nostrils, below which is the mouth. The tongue can be felt, and, in

some cases, the fœtus sucks the examining finger. Below the mouth is felt the chin. If the membranes have been ruptured for some time, a face presentation may be mistaken for a breech. The cheeks become swelled, and a furrow forms between them; the mouth becomes round, and the caput succedaneum forms.

The nose, however, undergoes no change, thus preventing an error in diagnosis.

Breech.

Before Labor.—The presenting part cannot be touched by the finger on account of its high position in the pelvis. In some cases by forcing down the fundus of the uterus the breech can be reached, but even then it is generally impossible to recognize it. The breech is softer than the head and less uniform in shape. In some cases the fœtal members may be felt.

During Labor.—(*a*) *Before rupture of the membranes.* The presenting part being high up and the bag of waters very large, the sensations imparted to the examining finger are far from clear. On the other hand, the bag of waters being sausage-shaped and the presentation high up would be in favor of a breech presentation, or, at least, attract attention.

(*b*) *After rupture of the membranes.* The breech is recognized by being less round, and softer than the head; by the absence of fontanelles and sutures; by the groove between the buttocks; the anus, the genital organs, and the coccyx, the latter being the salient point in the diagnosis; the anus always offers a resistance to the entrance of the finger, "and the latter upon withdrawal will be covered with meconium." If the feet can be touched by the finger the diagnosis is, of course, easier.

How can a foot be distinguished from a hand?

Foot.	*Hand.*
At a right angle to the leg.	In the prolonged axis of the forearm.
Os calcaneum. Malleoli.	
The margins of unequal thickness.	The margins of equal thickness.
The toes are placed in a straight line.	The thumb is not on the same plane as the fingers.

Foot.	*Hand.*
The great toe cannot be separated from the second and brought in contact with the other toes.	The thumb can be separated from the index finger and brought in contact with the other fingers.
The toes are short.	The fingers are long.

How can the knee be distinguished from the elbow?

Knee.	*Elbow.*
Broad.	Not so broad.
The patella is flat.	The olecranon is pointed; the two condyles of the humerus can be felt.
The leg and thigh are thick.	The arm and forearm are not so thick.

Shoulder.

Before Rupture of the Bag of Waters.—The presenting part is out of reach, and the bag of waters very large, rendering the diagnosis almost impossible.

After Rupture.—The following are the landmarks: The ribs, called by Pajot the "intercostal gridiron;" the acromion; the scapula and its spine; the clavicle; and the axillary cavity.

How is the diagnosis of positions made by vaginal touch or indigation?

As position is the relation which the presentation bears to one of the four cardinal points of Capuron, it naturally follows that a point of reference must be selected upon the presenting part to be in relation with one of the fixed points of the pelvis. The points of reference are as follows: Vertex, the occiput; face, the forehead; breech, the sacrum.

Vertex.

There are four positions of the vertex. If the occiput is placed toward the left ilio-pectineal eminence, L. O. A.; if to the right ilio-pectineal eminence, R. O. A.; if to the right sacro-iliac joint, R. O. P.; if to the left sacro-iliac joint, L. O. P.

L. O. A. The sagittal suture is in the right oblique diameter of

the pelvis; the anterior fontanelle is in relation with the right sacro-iliac joint; the posterior fontanelle is directed toward the front and left of the pelvis; and the occiput is at or near the left ilio-pectineal eminence.

R. O. A. The sagittal suture is in the left oblique diameter; the anterior fontanelle is in relation with the left sacro-iliac joint; the posterior fontanelle is directed toward the front and right of the pelvis; and the occiput is at or near the right ilio-pectineal eminence.

R. O. P. The sagittal suture is in the right oblique diameter; the anterior fontanelle is in relation with the left ilio-pectineal eminence; the posterior fontanelle is directed toward the back and right of the pelvis; and the occiput is at or near the right sacro-iliac joint.

L. O. P. The sagittal suture is in the left oblique diameter; the anterior fontanelle is in relation with the right ilio-pectineal eminence; the posterior fontanelle is directed toward the back and left of the pelvis; and the occiput is at or near the left sacro-iliac joint.

Face.

There are four positions of the face. If the forehead is placed toward the left ilio-pectineal eminence, L. F. A.; if to the right, R. F. A.; if to the right sacro-iliac joint, R. F. P.; if to the left, L. F. P.

L. F. A. The nose points toward the right sacro-iliac joint, and, therefore, the forehead must be at or near the left ilio-pectineal eminence. The chin is toward the right sacro-iliac joint. The face is in the right oblique diameter.

R. F. A. The nose points toward the left sacro-iliac joint, and, therefore, the forehead must be at or near the right ilio-pectineal eminence. The chin is toward the left sacro-iliac joint. The face is in the left oblique diameter.

R. F. P. The nose points toward the left ilio-pectineal eminence, and, therefore, the forehead must be at or near the right sacro-iliac joint. The chin is toward the left ilio-pectineal eminence. The face is in the right oblique diameter.

L. F. P. The nose points toward the right ilio-pectineal eminence, and, therefore, the forehead must be at or near the left sacro-iliac

joint. The chin is toward the right ilio-pectineal eminence. The face is in the left oblique diameter.

Breech.

There are four positions of the breech. If the sacrum is toward the left ilio-pectineal eminence, L. S. A.; if to the right ilio-pectineal eminence, R. S. A.; if to the right sacro-iliac joint, R. S. P.; if to the left sacro-iliac joint, L. S. P.

L. S. A. The coccyx points toward the right sacro-iliac joint: therefore, the sacrum is at or near the left ilio-pectineal eminence. The groove between the buttocks is in the right oblique diameter of the inlet.

R. S. A. The coccyx points toward the left sacro-iliac joint: therefore, the sacrum is at or near the right ilio-pectineal eminence. The groove between the buttocks is in the left oblique diameter.

R. S. P. The coccyx points toward the left ilio-pectineal eminence: therefore, the sacrum is at or near the right sacro-iliac joint. The groove between the buttocks is in the right oblique diameter.

L. S. P. The coccyx points toward the right ilio-pectineal eminence: therefore, the sacrum is at or near the left sacro-iliac joint. The groove between the buttocks is in the left oblique diameter.

Shoulder.

There are two positions each for the right and left shoulder.

Right Shoulder.—If it presents with the back anterior, R. D. A.; if posterior, R. D. P. In the former position the head is in the left iliac fossa and the breech on the opposite side; in the latter, the head is in the right iliac fossa and the breech on the opposite side.

Left Shoulder.—If it presents with the back anterior, L. D. A.; if posterior, L. D. P. In the former position the head is in the right iliac fossa and the breech on the opposite side; in the latter, the head is in the left iliac fossa and the breech on the opposite side.

R. D. A. First find the situation of the head. The axillary space represents an angle with its apex pointing toward the head. Therefore we find the apex of the axilla pointing toward the left side—the position of the head. Now if the head is in the left

iliac fossa, we have one of two positions; either a R. D. A. or a L. D. P. The position of the back completes the diagnosis. If we feel the scapula anterior, we know that the back of the fœtus is toward the front of the mother; in some cases we may also feel the spinous processes of the vertebræ.

R. D. P. The apex of the axilla points toward the right side—the position of the head. Recognizing the clavicle, we know that the anterior plane of the fœtus is toward the front of the mother.

L. D. A. The apex of the axilla points toward the right side—the position of the head. Feeling the scapula and possibly also the spinous processes of the vertebræ, we know that the back is anterior.

L. D. P. The apex of the axilla points toward the left side—the position of the head. Recognizing the clavicle, we know that the anterior plane of the fœtus is toward the front of the mother.

If the hand is outside the vulva, how can we determine whether it is the right or left?

1. Take the hand of the child and shake hands.

2. If the palm of the hand of the obstetrician and the palm of the child's hand be applied flat against each other, and the thumbs of the two hands touch, the hand of the child will be left if the practitioner is using his right; right if using his left.

3. Turn the palm of the child's hand up toward the symphysis pubis and if the thumb points toward the left side of the mother, it is the left hand presenting; if to the right, the right hand.

Charpentier gives the following conclusions:

"The hand gives us the shoulder; the dorsum of the hand, the situation of the head; the direction of the thumb indicates the direction of the back; for when the back is posterior, the thumb points upward from the symphysis. When the back is anterior, the thumb is directed downward toward the anus."

Into how many stages is the mechanism of labor divided?

Six.

What are the stages of the mechanism of labor in a vertex presentation?

1. Stage of flexion.
2. Stage of descent or engagement.

3. Stage of rotation.
4. Stage of extension.
5. Stage of external rotation of the head and internal rotation of the body.
6. Stage of delivery of the body.

Describe the mechanism of labor in a L. O. A. position. See fig. 37.

First Stage.—Flexion: This is practically rotation of the head on a transverse axis; the chin being pressed against the chest. Before flexion takes place the occipito-frontal diameter is in relation with the right oblique diameter of the superior strait and the biparietal with the left. After flexion has occurred, however, the suboccipito-bregmatic diameter is substituted for the occipito-frontal. In other words, a short diameter takes the place of a long one; flexion, therefore, is simply a movement of *accommodation.* The causes of flexion are as follows: First, it is simply an exaggeration of the natural position of the fœtus (attitude). Second, the pressure from below acts with more power upon the forehead than it does upon the occiput, on account of the distance of the former from the occipital foramen being greater than the latter. In other words, the head represents a lever, having arms of unequal lengths; pressure from below causes the long arm—the forehead—to ascend, while the short arm—the occiput—descends. Third. "If a propulsive force be exercised centrally upon a mobile, and there be resisting forces not directly opposite to each other, but at different levels, rotation of the mobile occurs." This law of mechanics has been advanced as assisting flexion.

Second Stage.—Descent: The descent of the head is brought about by uterine contractions, assisted by the action of the abdominal muscles. The head enters the pelvis in the axis of the inlet, and continues in this direction until the curve of the sacrum and the pelvic floor change its course.

Levelling, which is a partial extension of the head, occurring when the occiput is at the lower border of the ischio-pubic foramen, and the bregma near the second sacral bone, takes place according to some authorities. It is, however, of no importance in the mechanism of labor.

FIG. 37.

Figure illustrating the mechanism of labor in occipito-anterior deliveries. (Schultze.)

FIG. 38.

Figure illustrating the mechanism of labor in occipito-posterior positions. (Schultze.)

Third Stage.—Rotation: This movement of the head brings the occiput directly in front. The suboccipito-bregmatic diameter is now in relation with the longest diameter of the outlet (antero-posterior), and the bi-parietal with the transverse. While the head is undergoing this change of position, rotation of the body of the fœtus also occurs.

Authorities do not agree as to the causes of the phenomenon of rotation. The following are the explanations given: 1. The law of mechanics, already referred to as explaining rotation on a transverse axis (flexion). 2. Pajot's law of accommodation. 3. Forces acting on a lever having arms of unequal lengths. The short arm —the occiput—moves toward the front, the point of least resistance. 4. The direction given the occiput by the inclined planes of the pelvis.

Fourth Stage.—Extension: Flexion of the head continues until the occiput is engaged between the rami of the pubes. The nape of the neck now becomes fixed against the subpubic ligament; the chin gradually leaves the chest, and the head is born in a state of extension. During this stage the shoulders lie in the transverse diameter. The extension of the head is the resultant of two forces —the uterine contractions and the action of the muscles of the pelvic floor. The occiput unable to advance further, the uterine force causes the chin to leave the chest and pushes the forehead beyond the apex of the sacrum; the perineum then drives the occipito-frontal diameter forward. When the bi-parietal diameter has passed the vulva, the perineum retracts and gliding over the face pushes the occiput upward against the symphysis pubis.

Fifth Stage.—External rotation of the head and internal rotation of the body: After the expulsion of the head it drops down toward the anal region, and a contraction of the uterus coming on, the occiput makes a quarter rotation toward the thigh corresponding to the side of the pelvis in which it was originally situated. At the same time, rotation of the body occurs, bringing the shoulders in relation with the longest diameter of the outlet (antero-posterior). Restitution is a rotation of the head occurring immediately after its expulsion. It is due to the body failing to rotate along with the head during the third stage.

Sixth Stage.—Expulsion of the body: Uterine action continuing

the anterior shoulder passes out under the pubic arch, and the upper part of the arm becomes fixed at the subpubic ligament. The posterior shoulder sweeps over the sacrum and pelvic floor, causing a strong lateral flexion of the body. Finally, the shoulder is born, followed by the arm, and then the anterior arm is delivered. The delivery of the trunk rapidly follows, describing a spiral movement as it passes out. The same mechanism occurs as in the birth of the shoulders if the hips are large.

Describe the mechanism of labor in a R. O. A. position.

The mechanism is the same as in a L. O. A. position already described.

Describe the mechanism of labor in a R. O. P. and L. O. P. position.

The mechanism is, in almost all cases, the same as in the anterior positions of the vertex. The occiput, as is the rule in anterior positions, rotates anteriorly, the nape of the neck coming under the symphysis pubis. Again, restitution is more frequent in posterior positions. The anterior rotation of the occiput is due to the fact that it is acted upon by forces which cause it to rotate anteriorly in the direction of least resistance; this is the application of the same law of mechanics referred to as assisting rotation in anterior positions.

What is the mechanism of labor if the occiput fails to rotate anteriorly?

The occiput rotates into the sacral cavity, and descends in the axis of the pelvis. It sweeps over the pelvic floor and escapes through the vulva, the neck resting upon the perineum. The head is then born by extension. The completion of labor is then effected by the same mechanism that occurs in an anterior rotation. Cases are on record, the head being small, of the presentation being changed into a face at the outlet. The chin, under these circumstances, comes under the symphysis pubis and is born first, while the head is delivered by flexion. These cases are extremely rare.

What are the stages of the mechanism of labor in a face presentation?

1. Stage of extension.
2. Stage of descent.
3. Stage of rotation.
4. Stage of flexion.
5. Stage of external rotation of the head and internal rotation of the body.
6. Stage of delivery of the body.

Describe the mechanism of labor in a L. F. A. position. See fig. 38.

First Stage.—Extension: The object of complete extension is to substitute the fronto-mental diameter for the mento-bregmatic; in other words, the process is one of *accommodation.* Complete extension is due to the fact that the arms of the face lever are of unequal lengths, hence the face being driven down from above meets with resistance, causing the forehead to ascend, while the chin descends. Again, the original position of partial extension necessarily favors complete deflection.

Second Stage.—Descent: This has been fully explained in the description of the corresponding phenomenon in a vertex presentation.

Third Stage.—Rotation: The chin rotates anteriorly and comes under the symphysis pubis, while the forehead is in relation with the sacrum. The forehead rotates posteriorly, because the frontal arms of the face lever being longer meet with greater resistance anteriorly. Again, the forehead presenting a large surface finds more room in the sacral cavity.

Fourth Stage.—Delivery of the head by flexion: The chin escapes and the throat pivots under the symphysis pubis. The chin is now pushed up over the pubic joint, while the face, and, finally, the occiput, is born, escaping over the perineum. After the birth of the occiput the head sinks toward the anal opening.

Fifth Stage.—External rotation of the head and internal rotation of the body: The mechanism is the same as in a delivery of the vertex. "The forehead, or the chin, always turns toward that thigh corresponding with the side of the pelvis which it occupied."

Sixth Stage.—Delivery of the body: The mechanism is the same as in vertex delivery.

What are the anomalies in the mechanism of labor in presentations of the face?

In a normal mechanism, the chin always rotates anteriorly, in both anterior and posterior positions.

The following are the anomalies in mechanism.

1. *Extension of the Head may be only Partial, the Forehead Presenting.*—Then, one of two conditions, as a rule, results. Either flexion occurs and the vertex presents, or extension becomes complete, and the face offers; the latter is the more frequent.

2. *The Face may be Delivered in the Transverse Diameter.*—This is possible in a rachitic pelvis, which is shallow, flattened in the antero-posterior at the inlet, and wide between the ischia.

3. *The Chin may Rotate into the Sacral Cavity.*—Spontaneous delivery is impracticable under these circumstances at full term with a normal pelvis. For the head to be delivered the chin must rest upon the anterior margin of the perineum. But the distance from the tip of the chin to the sterno-clavicular articulation is much less than the length of the sacral wall; hence, as the pelvic cavity is already occupied by the head, the body of the fœtus is prevented from descending; therefore, delivery cannot take place.

What are the stages of the mechanism of labor in a pelvic presentation? See fig. 39.

1. Stage of compression, or moulding.
2. Stage of descent.
3. Stage of rotation.
4. Stage of delivery of the body.
5. Stage of external rotation of the body and internal rotation of the head.
6. Delivery of the head.

Describe the mechanism of labor in a L. S. A. position.

The first two stages need no explanation beyond what has already been given.

Third Stage.—Rotation: The anterior hip rotates forward under the pubic arch, while the bistrochanteric diameter is brought in

FIG. 39.

Illustration showing lateral inflexion of the trunk during delivery of the breech.

FIG. 40.

First step—Reduction.

FIG. 41.

Second step—Engagement.

SPONTANEOUS EVOLUTION.

relation with the antero-posterior diameter of the pelvic outlet. During this movement of the hips the body of the fœtus also rotates.

Fourth Stage.—Delivery of the trunk: The anterior hip pivots against the subpubic ligament, while the posterior hip passes over the perineum and is born. The anterior shoulder now becomes fixed at the pubic arch, while the posterior shoulder is delivered first, by passing over the perineum. During this stage of the mechanism the upper extremities remain closely pressed upon the chest.

Fifth Stage.—External and internal rotation: The occiput now rotates behind the symphysis pubis, while the face turns toward the sacrum.

Sixth Stage.—Delivery of the head: The nucha pivots upon the subpubic ligament, while the head is born strongly flexed. The chin is delivered first, followed, finally, by the occiput.

What are the anomalies of the mechanism of labor in pelvic presentations?

The most common irregularity in the mechanism is the rotation of the occiput into the sacral cavity. The mechanism now depends upon whether the head remains flexed or becomes extended. In the former case, the nape of the neck presses against the anterior edge of the perineum and the head is born by flexion, the occiput passing out last, the back of the child being directed toward the back of the mother. In the latter case, however, the chin remains above the pubic symphysis, and the throat rests against the subpubic ligament. The head being born extended, the occiput passes out first, followed, finally, by the face. The abdomen of the child is directed toward the abdomen of the mother.

In how many ways may spontaneous delivery occur in shoulder presentations?

Three, viz.:

1. The fœtus is born doubled (*corpore reduplicato*); this can only occur when it is very small.
2. Spontaneous version; this may be either cephalic or pelvic.
3. Spontaneous evolution.

What are the stages of the mechanism of labor in spontaneous evolution? See figs. 40, 41, 42, 43, and 44.

1. Stage of compression.
2. Stage of descent.
3. Stage of rotation of the shoulder.
4. Stage of delivery of the trunk.
5. Stage of external rotation of the trunk, and internal rotation of the head.
6. Stage of delivery of the head.

Describe the mechanism of labor.

The first two stages need no further description.

Third Stage.—Rotation: The presentatory shoulder rotates anteriorly, and becomes fixed under the symphysis; the arm protruding from the vagina.

Fourth Stage.—Delivery of the body: "The anterior shoulder remaining fixed under the symphysis pubis and appearing first, the uterine contractions force the posterior shoulder (and the rest of the fœtus) from above downward, making it, in its descent, sweep along the posterior wall of the excavation. At last, urged on by the contractions, it distends the perineum, passes the posterior commissure, and is followed by the axilla, the thorax, the hips, the breech; and then the shoulder fixed under the symphysis is disengaged in its turn, while the head remains in the uterus to the last."

Fifth and Sixth Stages.—These are the same as in breech deliveries.

Should a presentation of the shoulder be left to Nature?

No. The delivery of the fœtus must always be accomplished by art.

Management of Labor.

Anæsthesia.

What agents are usually employed to produce general anæsthesia in labor?

Ether, chloroform, chloral, and morphia.

What are the indications for anæsthesia in labor?

Ether and Chloroform.—Pain is the special indication for the

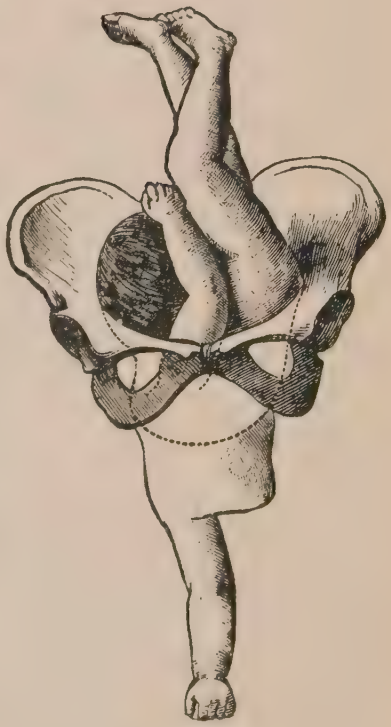
FIG. 42.

Third step—Internal rotation.

FIG. 43.

Fourth step—Disengagement of the trunk.

FIG. 44.



Infant bent double.

administration of an anæsthetic in labor. As a rule, it should be used in the second stage; however, in primiparæ it is often given in the first stage, when the cervix dilates slowly associated with great suffering. The anæsthetic should not be given continuously; it should be used only during a pain; it should not be pushed to the extent of "surgical, but obstetric anæsthesia," but during the delivery of the head may be carried to complete insensibility.

Ether should be used in preference to chloroform; the latter is unsafe, as it acts upon the motor ganglia of the heart and produces sudden heart failure. Again, the effect of chloroform is to relax the uterus, causing a cessation of labor pains, and rendering the danger of post-partum hemorrhage greater. Lusk, and others, hold that labor does not give an "absolute immunity" from the dangers of chloroform; Parvin, on the other hand, teaches that the freedom from danger is "almost complete."

Chloral.—This drug is especially indicated in the first stage of labor. It should be used when the pains cause acute suffering with but little tendency toward dilatation of the cervix. No remedy equals it in its action in a case of rigid, undilatable cervix. Used for acute suffering, or for the condition just stated, it should be given in fifteen-grain doses every twenty minutes, until three doses have been administered; in some cases it may be necessary to give an additional dose in an hour after the last is taken. The drug should be given per rectum in the yelk of an egg and six ounces of milk. The action of chloral does not interfere with the subsequent use of ether or chloroform, but rather tends to increase their efficiency. Chloral does not relax the uterus.

Morphia.—This drug is seldom used in a physiological labor. When indicated it should be given hypodermatically.

Preliminary Preparations.

What articles should be carried by the obstetrician?

A stethoscope; a hypodermatic syringe; a pair of obstetric forceps; antiseptic tape; an elastic catheter; needles, needle-holder, and dressing-forceps; sutures (silk, catgut, silk-worm gut,

or silver wire); a solution of morphia; the fluid extract of ergot; and the perchloride of iron.

What articles should be provided at the house of the patient?

A fountain syringe; an antiseptic solution (℞.—Hydrarg. chlor. cor. ʒj, alcohol fʒj.—M. Sig. Teaspoonful added to a quart of water equals 1 part to 2000); sulphuric ether; a half-dozen powders of chloral, each containing 15 grains; absorbent cotton; and a ligature for the cord. Hot and cold water, brandy, and ice, should be kept in readiness. One word in reference to the fountain syringe and hot water: these are of absolute importance, and when needed must be had on the instant. No physician should attend a case of obstetrics without having hot water and a syringe at hand to control post-partum hemorrhage; and furthermore, antiseptic measures cannot be thoroughly carried out without the latter article.

How should the bed be prepared?

The bed should be placed so as to allow access from both sides. upon it place a hair mattress, or one made of some firm material; then spread a rubber cloth over the lower portion of the mattress to protect it, and over this place a comforter or blanket. Over the comforter spread a folded sheet, and over the upper part of the mattress place another sheet folded once upon itself. After labor remove the rubber cloth and everything upon it, and then bring down completely over the mattress the lower half of the upper sheet.

How should the patient's clothing be arranged for delivery?

The night dress or chemise should be raised upon the hips, and a sheet folded once secured to it by means of safety pins. After delivery remove the sheet, and bring the chemise down over the hips and limbs.

First Stage.

What is the management of the first stage of labor?

Position of the Patient.—The patient should not lie down in bed, as the dilatation of the cervix and the descent of the head into the pelvis are favored by the upright or sitting posture.

Bladder and Rectum.—She should pass her urine frequently; if there be retention, the elastic catheter should be used. If the rectum, at the time of making a vaginal examination, is found to contain feces, it should be at once emptied with an enema of soap and water.

Food and Drink.—Parvin advises the use of simple food if it be required. She should drink cold water; hot teas and alcoholic drinks, he holds, ought to be forbidden. Playfair, on the other hand, advises beef-tea to be freely given, and, if the patient be weak, the occasional use of brandy and water.

Vaginal Examinations.—An examination should be made every hour to ascertain the progress of the labor.

Membranes.—If spontaneous rupture of the membranes does not occur as soon as the cervix is fully dilated, they should be artificially broken. This may be readily done with the end of a hair-pin pressed against the amniotic pouch between the contractions of the uterus; or, the nail of the index finger may be nicked in one or two places, and with a saw-like motion the membranes ruptured between the pains.

Dilatation of the Cervix.—The dilatation of the cervix should be left to nature. Any artificial interference with this process is unjustifiable in normal labor, and increases the dangers of septic infection.

Attendance of the Physician.—During this stage the obstetrician should not remain constantly with the patient.

Second Stage.

What is the management of the second stage of labor?

Position of the Patient.—The patient should be in bed during the entire time. Before the head has reached the floor of the pelvis the patient should, during a pain, sit up in bed, with her feet fixed and her hands pulling upon a sheet attached to the lower part of the bed, or she should take hold of the hands of the nurse. At the time of delivery she should assume the left lateral position. This position lessens the danger of rupturing the perineum, and enables the obstetrician to make such manipulations as may be necessary.

Vaginal Examinations.—Immediately after the rupture of the membranes an examination should be made per vaginam to determine the increase in the descent of the head, to verify the diagnosis of presentation and position, and to ascertain whether any complications exist.

During this stage the examinations must be more frequent, so that the position of the presenting part may be known from time to time. If the head remains stationary for two hours at the perineal floor, labor should be terminated by art.

Condition of the Cervix.—Artificial dilatation, as a rule, should not be attempted. If the cervix be directed backward and to the side, hook the fingers into it in the interval of a pain, and draw it toward the centre of the parturient-canal. Occasionally the anterior lip of the cervix becomes impacted between the head and the pubes, in which case it becomes swollen, retarding the progress of labor. To overcome this condition press up the anterior lip, in the interval of a pain, with two fingers, and hold it above the head when the following uterine contraction comes on. It may be necessary to repeat this manipulation.

Management of the Voluntary Bearing-down Efforts.—If the pains are strong, and the progress of labor rapid, voluntary efforts certainly do no harm. The patient should bear down only during a pain. When the head distends the perineum all voluntary effort should stop, and the patient told to "cry out," otherwise the sudden tension upon the perineum may cause a laceration.

When the labor is slow, bearing-down efforts should be discouraged, as they only unnecessarily tire the patient. During the first stage of labor voluntary efforts are not only useless but injurious.

Food, Drink, Rectum, and Bladder.—The patient will, as a rule, require but little food, and what is given should be in small quantities and simple. Cold water will be all that is needed in the way of drink. The patient's face and hands should, from time to time, be bathed with cold water.

The rectum and bladder must be emptied. The patient often expresses a wish to empty the bowels during this stage. This desire, however, is caused by the pressure of the advancing head upon the rectum.

Preparation for Delivery.—The following articles should be in readiness: a fountain syringe, hot and cold water, scissors, a ligature for the cord, and brandy or whiskey.

Preservation of the Perineum. See fig. 45.

The position of the patient should be upon the side; the knees drawn up toward the abdomen, and a folded pillow placed between them. If the voluntary bearing-down efforts cannot be controlled, give an anæsthetic. If the perineum is not sufficiently relaxed to allow the escape of the head without producing a tear, the latter should be retarded in its exit by direct pressure. To accomplish this, pass the left hand over the right thigh of the patient, and with the thumb on the occiput and the fingers on the anterior part of the fœtal head, hold it back during uterine contractions.

FIG. 45.

Support of the perineum.

At the same time support the perineum with the right hand so placed that the fold between the thumb and index finger is in relation with its anterior edge, the thumb being upon the right while the fingers are upon the left side. Make moderate pressure during a pain in the direction of the symphysis.

Goodell advises introducing one or two fingers into the rectum,

and pulling the perineum forward toward the symphysis; the thumb at the same time making pressure on the head so as to retard its progress. Playfair's method is as follows: "If, when the head is distending the perineum greatly, the thumb and forefinger of the right hand are placed along its sides, it can be pushed gently forward over the head at the height of the pain, while the tips of the fingers may at the same time press upon the advancing vertex so as to retard its progress if advisable." Lusk claims by drawing the chin downward through the rectum until the perineum is distended by the head, and then allowing recession to take place, that many cases of rigidity can be overcome, and delivery effected without rupture, the head being born in the interval of pain.

Episiotomy, the term applied to the operation of making incisions into the perineum, may be justifiable when a rupture seems inevitable. The incisions should be lateral, one on each side of the central raphé. The operation should be done during a pain, at the same time guarding against the sudden delivery of the head. Lusk claims that episiotomy is "essentially the operation of young practitioners," and there is no doubt of the fact that the necessity for the operation is rarely if ever met with.

Birth of the body. When the head is expelled it should be held in the right hand, while the other hand, placed upon the abdomen, follows down the uterus as it descends and forces out the body. If the cord is coiled around the neck it should be managed as follows: Enlarge the loop, and draw the cord over the child's head, or deliver the shoulders and body through the loop; if these means fail, divide the cord and ligate each end. During the delivery of the shoulders support the perineum. Usually after some little delay, the shoulders are delivered. Their expulsion should be left to uterine contractions which may be strengthened by friction over the fundus with the left hand. The most common cause for delay in delivery is an arrest of the anterior shoulder beneath the symphysis. To liberate the shoulder make traction directly downward with the hands placed on the sides of the head; it may also be necessary to assist the expulsion of the posterior shoulder by directing the head up toward the symphysis, at the same time making slight traction. After the shoulders are de-

livered the body is rapidly expelled; if, however, there be any delay, grasp the thorax with the hands and make gentle traction.

Care of the Child.—Place the child near the side of the bed away from the mother's discharges; care being taken not to drag upon the cord. If respiration does not occur, clear the mucus from the throat and mouth with the finger, and place the child in a basin of hot water, leaving the chest exposed, and then dash cold water upon it until the breathing is established. Another good plan is simply to rub spirits of camphor over the chest. After the cord has been tied the child should be handed to the nurse.

Tying the Cord.—Tie the cord "when the child breathes freely and the pulsations lessen in force." In tying use, if possible, the antiseptic tape; use two ligatures, one "about three fingers' breadth from the umbilicus," the other "at a distance of two inches from the first ligature and toward the placenta." Before handing the child to the nurse always examine the cut surface of the cord to see if the ligature controls the vessels. Late ligation of the cord is advised by some authorities. In late ligation the cord is not tied until the pulsations cease entirely. The advantages of this plan are that the child receives more blood than in early ligation, and that it loses less weight during the first week following birth. Late ligation is especially indicated in children who are born prematurely, or who are badly nourished.

Third, or Placental Stage.

What is the management of the third stage of labor?

Care of the Mother.—The patient should be placed upon her back after the delivery of the child. Immediately after the birth the nurse should place her hand over the uterus and keep it there until the obstetrician is ready to attend to the delivery of the placenta.

Placental Delivery.—The indications in the management of the third stage of labor are, to assist in the delivery of the placenta, to keep up uterine contractions, and to prevent hemorrhage.

Credé's method is the plan usually employed to effect expression of the placenta. It consists in making at first gentle and then

stronger frictions over the fundus and body of the uterus through the abdominal wall. During a uterine contraction the hand grasps the uterus, with the fundus resting in the palm, while the sides are compressed between the fingers and thumb, at the same time making moderate pressure in a downward direction. The expulsion of the placenta from the uterus is generally effected after three or four uterine contractions. After the placenta has been expelled into the vagina, traction may be made upon the cord, and extraction slowly accomplished, at the same time keeping up pressure upon the fundus of the uterus. As the placenta is withdrawn from the vagina, Lusk and Playfair advise that it should be revolved so as to twist the membranes into a rope. Parvin, however, teaches that this manœuvre is not necessary, as there is no danger of any part of the membranes being torn off if the placenta be gradually removed. After the placenta has been delivered the obstetrician should examine its uterine surface to be sure that no portion has been left in the cavity of the uterus.

Administration of Ergot.—After the placenta has been delivered give the patient half a drachm or more of the fluid extract of ergot.

Application of the Binder.—The binder should be wide enough to extend from the ensiform cartilage to the trochanters. It should be pinned securely with safety-pins; the pinning either begun above or below. Unbleached muslin makes a very good bandage. In case it is necessary to use compression over the uterus, the following plan should be adopted: "Make three firm rolls rather thicker than the wrist, of as many towels; then place one of them transversely just above the uterus and the other two at its sides, and let the bandage be pinned firmly over them."

How should the cord be treated?

Cut off the cord at the point where it is ligated, and squeeze out Wharton's jelly, and then apply a new ligature. Then dust over the cord some iodoform or salicylic acid, and secure it by a few turns of a muslin bandage. Lusk simply wraps the cord in absorbent cotton and places it on the left side, where it is retained in place by the binder.

Describe the method of washing the child.

The vernix caseosa should be softened and removed with the

yelk of an egg or some oily substance, such as lard, vaseline, sweet oil, etc. The bath should be about 98° F.; a fine soap should be used to cleanse the child, as the more common article is apt to irritate the skin. After bathing, the child should be gently dried, and the "belly-band" applied.

What precautions should be taken in the application of the "belly-band"?

The bandage around the body of the child should be loose when first applied; if this precaution is not taken, it may become too tight in the course of a few hours, on account of the increase in the pulmonary capacity.

Asphyxia Neonatorum.

How many forms of asphyxia occur?

Two; asphyxia livida and pallida.

What are the symptoms of asphyxia livida?

The surface of the child is cyanotic; the face is swollen and of a dusky hue; the conjunctiva is injected, and the eyeballs protrude. The muscles are somewhat rigid, and the pulsations in the cord are strong and slow. Irritation of the skin causes reflex movements.

What are the symptoms of asphyxia pallida?

The skin is anæmic; the surface cold; the muscular system is relaxed, and the extremities and lower jaw hang loosely down; irritation of the skin is not followed by reflex movements. The pulsations in the cord are almost imperceptible.

What is the treatment in asphyxia pallida?

In this form of asphyxia the child requires all the blood it can get; to accomplish this object press the blood from the cord toward the umbilicus. Next tie the cord and cut it. The first step toward resuscitation is to remove any mucus or fluid which may have collected in the air-passages. For this purpose the little finger answers very well. Lusk advises the removal of the fluid by aspiration with an elastic catheter (No. 6 or 8) passed through the glottis. After the air-passages have been cleared of fluid, place the child in a basin of hot water and dash cold water upon the

epigastrium. Then remove the child from the bath and make friction over the chest, spine, and the soles of the feet. If these means fail, after trying them for ten minutes, resort to artificial respiration.

What is the treatment in asphyxia livida?

Cut the cord and allow two or three drachms of blood to escape before tying. The methods already described in the treatment of asphyxia pallida should be tried before resorting to artificial respiration.

What are the methods of performing artificial respiration?

1. Silvester's method; 2. Schultze's method; 3. Insufflation through a tube; 4. Mouth-to-mouth insufflation.

Describe these methods. See figs. 46 and 47.

Sylvester's Method.—The child is placed upon its back with the shoulders slightly raised, and wrapped in warm clothing. Now grasp the arms above the elbows and bring them quickly upward by the sides of the head and everted; then bring them down again against the sides of the chest and make firm pressure. These movements should be repeated at intervals corresponding with normal respirations. This method is generally useless.

Schultze's Method.—The best method. The accoucheur, standing with the body slightly bent forward, the legs moderately separated, the arms extended toward the ground, seizes the infant by the index fingers passed from behind forward into the axilla. The thumbs rest gently over the clavicles, and the remaining fingers are applied against the posterior surface of the clavicle in the direction from above downward.

"The infant's head is supported against the wrists. This position is that of inspiration (Fig. 4). The accoucheur, thus holding it, suddenly throws the infant forward and upward. When the accoucheur's arms are a trifle above the horizontal line, the motion is gently stopped, so as not to jerk the child, and the fœtal lumbar spine is flexed, the abdomen being forcibly compressed by the weight of the pelvic extremity (Fig. 5). . . . The position of the child is now gently changed to that which it occupied at the outset."

Insufflation through a Tube.—The best instrument to use is Depaul's modification of Chaussier's tube. First clear the air-passages of mucus and then guide the tube into the larynx by the finger. Before blowing into the tube the nostrils must be closed

FIG. 46. FIG. 47.

Schultze's method.

Inspiration. Expiration.

and the mouth pressed around the instrument. Insufflate from ten to fifteen times a minute, using "some force." Expiration is reinstated by pressing upon the chest. This process must be continued in some cases for an hour or more.

Mouth-to-mouth Insufflation.—Wipe the mouth of the child and clear away the mucus from the air-passages. Then the accouch-

cur, after taking a full inspiration, places his mouth to that of the child, and expires with some force into its air-passages. Expiration is assisted in the child by pressure upon its chest and stomach. During the act of inspiration it is unnecessary to close the child's nostrils.

What is gavage? See fig. 48.

Gavage is the name given to a method of feeding new-born infants who are prematurely delivered or who are poorly nourished. "Take a piece of gutta-percha tubing about the size of a No. 14 or 15 French catheter. This is fixed on one of the breast shields in common use for sore nipples. The child is placed on the knee of the nurse, with the head slightly raised. The sound is moistened with milk, and introduced at the base of the tongue; the child, by a reflex act of deglutition, will generally draw it as far as the entrance to the œsophagus; if not, it is gently conducted there until fifteen centimetres of the sound are introduced. Pinch the sound between two fingers, pour into the cupula two or three tablespoonfuls of milk, and relax pressure until it flows gently into the stomach. The sound must be taken out gently and quickly, and the infant placed in the warm cradle or couveuse. The apparatus must be washed in a solution of boric acid and pure water. The quantity of milk given to the weakest infants is eight grammes every hour."

By this system children of six months have been saved.

Occipito-posterior Positions.

How is an occipito-posterior position managed?

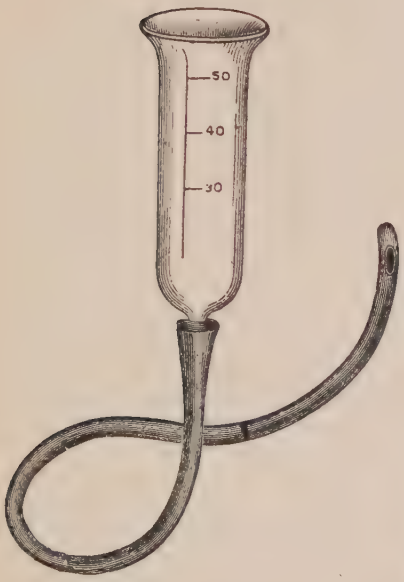
Make direct pressure upon the occiput. The occiput rotates posteriorly because it meets with too great resistance; therefore, by preventing the descent of the forehead, we at the same time indirectly lessen this resistance.

Face Presentations.

Should an attempt be made to substitute the vertex for a face?

Yes, if seen before labor, or if the chin is posterior.

FIG. 48.



Tarnier's apparatus for the artificial feeding of premature or feeble infants. (Gavage.)

FIG. 49.

Hydrocephalic fœtus.

How treat a delay in the anterior rotation of the chin?

By making direct pressure upon the forehead or upon the posterior cheek with the hand, or forceps-blade. If the chin rotates into the sacral cavity, craniotomy must be performed. Walcher's position (the patient upon the back with the hips in extreme elevation at the edge of the bed, the thighs hanging in extreme extension), by increasing the pelvic diameters, may facilitate the labor.

What precaution should be taken in the management of face presentations?

Care should be exercised not to injure the eyes during vaginal examination. Should any delay occur during the birth of the head, it may be necessary to assist the delivery, as the throat being pressed against the symphysis, may endanger the life of the child. The family should be informed of the probable distortion of the face, and assured of its early spontaneous disappearance.

Brow Presentations.

What is the management of presentations of the brow?

If the pelvis be roomy and the head small, spontaneous delivery may occur in a brow presentation. If a brow presentation does not change into a vertex or face, artificial cephalic version should be performed, or, this failing, the child delivered by podalic version. If the chin becomes fixed in a posterior position, try to bring down the occiput and produce a vertex presentation; failing in this, craniotomy or symphysiotomy must be performed.

How should pelvic presentations be managed?

Anæsthesia.—The anæsthesia should be obstetric, not surgical, as the patient must employ both the voluntary and involuntary forces of expulsion.

Membranes.—Preserve the membranes as long as possible. Have the patient lying down during the first stage of labor; place her on her side, and instruct her not to bear down. When the membranes become elongated, make counter-pressure by means of a Barnes's dilator inserted into the vagina.

Delivery of Breech.—The perineum should be supported. The patient should be told to bear down during the contractions. As

the breech is born it should be received in the palm of the hand and carried upward.

Umbilical Cord.—As soon as the cord can be reached, it should be drawn down and placed to the side of the sacral cavity. If the cord be coiled around one of the thighs it should be slipped over it. The pulsations of the cord should be felt from time to time, and any indication of failure of the circulation must be met by artificial extraction.

Delivery of Body.—The breech is now supported by one hand, while with the other pressure is made over the fundus of the uterus, the patient at the same time aiding the delivery by making bearing-down efforts. During the delivery of the arm and shoulders the hips should be raised and the perineum supported. Traction should not be made upon the trunk, as it may cause displacement of the arms or extension of the head. If the former accident occurs, bring down the posterior arm first. This may usually be accomplished by passing one or two fingers up to the elbow and drawing the forearm over the chest. If the elbow cannot be reached, then make pressure directly upon the upper part of the arm.

Delivery of Head.—The occiput rotates anteriorly, while the face occupies the sacral cavity. As soon as rotation has taken place the body of the child should be raised toward the mother's abdomen; at the same time keeping up flexion of the head by pressure upon the forehead with the fingers, either placed on the perineum or inserted into the rectum. If any delay occurs in the delivery of the head, the patient should make bearing-down efforts; at the same time the accoucheur should exert supra-pubic pressure and frictions over the uterus, together with traction on the lower jaw. The accoucheur should always have the forceps at hand in every case of head-last labor. Delay in the expulsion of the head may be caused, in some cases, by the os uteri contracting around the neck of the child. This condition may be overcome by dilatation of the cervix with the fingers, or by incisions.

Posterior Rotation of the Occiput.—The mechanism of labor in a posterior rotation of the occiput has already been referred to.

What are the methods advised for extraction in a pelvic presentation when the fœtus is doubled?

1. Hooking the finger over the groin.

2. The application of the forceps; Tarnier's instrument should be preferred.

3. Traction with a blunt hook inserted between the thighs with its point toward the side of the mother's pelvis. As a rule, it is applied over the anterior thigh. There is danger of perforation.

4. Bring down a foot. By this method the wedge is decomposed.

5. The use of the fillet.

What is the management of labor in multiple pregnancies?

If the presentation of the first child be favorable, rupture the membranes after the cervix is fully dilated. The cord of the first child should have a second ligature applied to it. During the delivery of the second child, keep the hand firmly applied to the uterus. The delivery of the placenta should be effected as in normal labor. In the majority of cases the second child is delivered in about twenty minutes after the first. If the placenta remains in the uterus after the birth of the first child, the accoucheur must not leave the patient until the second fœtus is delivered. On the other hand, however, if the first child be feeble or dead, and the placenta comes away with it, leave the case to nature, as the second child, under these circumstances, may go to term. The after-treatment of plural deliveries is the same as in normal births; greater precautions, however, must be taken to guard against post-partum hemorrhage.

How should cases of difficult delivery of the shoulders be managed in head-first labors?

1. Instruct the patient to make bearing-down efforts; the accoucheur at the same time pressing upon and making friction over the uterus through the abdominal wall; or

2. Apply the hands to the sides of the head and make traction upward toward the pubes; or

3. Make traction on the posterior shoulder with the finger hooked into the axilla; or

4. Make traction with the fingers in each axilla; or

5. Push the anterior shoulder back beyond the symphysis; this brings the posterior shoulder to the edge of the perineum. Now carry the head backward, and the anterior shoulder will again come beyond the arch of the pubes, and delivery be easily effected; or

6. Make traction with a blunt hook introduced into the axilla of the posterior shoulder.

Antisepsis.

Labor and Puerperal State.

What precautions should be taken against septic infection during labor and in the puerperal state?

1. *The Lying-in Room.*—This should be well ventilated and free from septic germs, especially those of scarlet fever, erysipelas, and diphtheria. Cancer of the uterus in an advanced stage and all forms of suppurative diseases are especially liable to cause septicæmia. All evacuations from the bladder and bowels, and soiled clothing, should be immediately removed from the room.

2. *The Nurse.*—The nurse should be free from skin-diseases, especially of a suppurative nature. She should not have attended recently patients suffering with scarlet fever, diphtheria, erysipelas, suppurative diseases, or puerperal septicæmia.

3. *Preparation of the Hands.*—The physician should carefully disinfect his hands before making an examination per vaginam in the following way: Wash them thoroughly with warm water and soap, using a nail-brush, after which soak them in a solution of corrosive sublimate, 1 to 1000. The same precautions apply to the nurse.

4. *Instruments.*—All instruments should be sterilized by placing them in boiling water.

5. *The Patient.*—At the beginning of labor the patient should be given a warm bath, and the external genital organs should be thoroughly washed with a solution of corrosive sublimate, 1 to 2000. If the labor be prolonged, a warm vaginal injection of cor-

rosive sublimate, 1 to 3000, should also be given. After using an antiseptic vaginal injection always wash out the vagina with warm distilled water. Antiseptic vaginal injections are especially indicated in the interests of the child when the mother is suffering with gonorrhœa or other purulent discharges, as a prophylactic measure against the occurrence of ophthalmia neonatorum.

After delivery the vagina should be washed out with the antiseptic solution and the external organs cleansed in a similar manner. The external organs should be washed twice daily with a solution of corrosive sublimate, 1 to 2000.

The vulva should be protected with a napkin which has been previously dipped in a warm solution of corrosive sublimate, 1 to 2000, and squeezed out. Only one antiseptic vaginal injection is indicated after labor, unless the soft parts have been torn, when the vagina should be irrigated twice daily and the tears, if slight, dusted with iodoform, but, if serious, sutures must be introduced.

The Pathology of Labor.

Precipitate Labor.

What are the causes of precipitate labor?

1. Excessive force and frequency of the uterine contractions;
2. Relaxation of the soft parts; oversize of the pelvis.
3. Under-size of the fœtus.

What is the prognosis?

Favorable with proper precautions, if the presentation of the fœtus is normal, and there is no obstruction in the birth-canal.

What are the dangers?

Laceration of the soft parts (cervix and perineum); subsequent relaxation of the uterus and post-partum hemorrhage; or the fœtus may die of asphyxia, from the continuous compression. If delivery occurs while the woman is standing, the child may be injured by the fall, the placenta may be detached, or inversion of the uterus occur. The bearing-down efforts, if excessive, may produce a subcutaneous emphysema of the chest, neck, and face. Syncope may result from sudden evacuation of the uterine contents.

What is the treatment?

The woman should be in bed and placed upon her side, and all bearing-down efforts should be forbidden. Inhalations of ether or chloroform are given, if necessary, to the extent of complete anæsthesia. Chloral, or hypodermatic injections of morphia, are also of service. Should emphysema occur, uterine efforts alone, or the forceps must terminate the labor. The condition disappears spontaneously in a few days after delivery.

Prolonged Labor.

What are the causes of prolonged labor?

1. Pelvic deformity.
2. Neoplasms encroaching upon the birth-canal.
3. Mal-presentations and positions of the fœtus.
4. Rigidity of the soft parts.
5. Malpositions of the uterus.
6. Deficiency of uterine force due to
   - *a.* General debility.
   - *b.* Premature rupture of the membranes.
   - *c.* Frequent child-bearing.
   - *d.* Age of patient.
   - *e.* Disorders of the intestines.
   - *f.* Over-distention of the uterus; for example, hydramnios or plural pregnancies.
   - *g.* Deficient uterine innervation.
   - *h.* Full bladder or rectum.
   - *i.* Mental influences.
7. Weak bearing-down efforts due to
   - *a.* General debility.
   - *b.* Great suffering associated with the uterine contractions.
   - *c.* The patient may be narcotized.

What is the prognosis?

The prognosis depends upon the stage of labor in which the delay occurs; upon the cause; and upon the condition of the mother and child.

First Stage of Labor.—1. *Child.* There is no danger to the child

as long as the membranes remain unruptured. Under these conditions labor may continue for any length of time, even days.

2. *Mother.* As a rule, there is no immediate danger to the mother. On the other hand, however, if the labor be extended to any great length of time, the patient may suffer seriously from exhaustion, loss of sleep and appetite.

Second Stage.—1. *Child.* Delay during this stage endangers the child's life by asphyxia and inspiration-pneumonia. Charpentier advises delivery with the forceps when the head has been arrested for an hour or two after reaching the pelvic floor.

2. *Mother.* The dangers to the mother are uterine rupture and the result of pressure upon the soft parts, causing sloughing, followed by fistulæ or septic infection. Again, the exhaustion may be so great as to endanger life, or, at least, to delay complete recovery for a long period of time.

Third Stage.—Hemorrhage invariably results in this stage if the uterus is in a condition of inertia.

The prognosis of delayed labor due to pelvic deformity, neoplasms, mal-presentations and positions, and displacements of the uterus is considered elsewhere under separate headings.

How is delayed labor treated?

It is hardly necessary to state that the treatment depends upon the cause. The treatment of labor in pelvic deformity, neoplasms, mal-presentations and positions, and displacements of the uterus is considered elsewhere.

1. *Rigidity of the Cervix.*—Chloral is the drug which will do the most service in this condition. In addition, if necessary, warm baths and injection of warm water into the vagina may also be employed. If, as is sometimes the case in old primiparæ, the rigidity presents a permanent obstacle to delivery, artificial dilatation of the cervix must be resorted to; Schroeder advised incisions to be made.

In cases of obliteration of the external os due to a superficial inflammation, the difficulty may be overcome by pressing upon the situation of the os with a finger during a uterine contraction, or by the uterine sound, or dilator.

If the obliteration of the os be due to cicatricial tissue, Nature,

as a rule, will overcome the difficulty assisted by artificial dilatation; it may be necessary, finally, to make incisions.

When the cervix is unable to retract over the presenting part, on account of adhesions between the membranes and uterine walls, separation may be effected by means of the finger or a soft catheter. Puncturing the membranes is also a good plan of treatment under these circumstances.

2. *Deficiency of Uterine Force.—*

a. Over-distention of the uterus. Rupture the membranes and allow the liquor amnii to escape. If the over-distention be due to polyhydramnios, the precautions already referred to should be taken.

b. Full bladder and rectum. The indication is to empty these organs; the former with a catheter, while the latter should be unloaded by a large enema.

c. Deficient uterine innervation. Under these circumstances the uterine contractions are increased by a change of position, walking or sitting, stimulating rectal injections, vaginal douches of hot water, and hot drinks, such as tea or lemonade.

d. Deficient uterine force, when due to premature rupture of the membranes, frequent childbearing, age, mental emotions, and general debility, is, of course, treated upon general principles, as the cause cannot be removed. Under these circumstances the treatment is essentially directed against the condition of uterine inertia, without reference to the cause. The treatment of weak labor pains will be considered later on.

e. Great suffering associated with ineffective labor pains. If this condition occurs in the first stage, give chloral. Thirty grains should be given at once by the rectum and repeated in one-half hour. If administered by the mouth, give fifteen grains every quarter of an hour, until four doses have been taken.

f. Temporary exhaustion. Occasionally in the first stage of labor the patient becomes restless, and exhausted on account of the pains being weak and ineffective; the indication is to create a temporary rest. Under these conditions give either chloral or morphia.

What means are employed to stimulate weak and ineffective uterine contractions?

1. *Drugs.*—

a. Quinine. It should be given in a dose of from fifteen to twenty grains. It will not excite uterine contractions, but stimulates them when present by its general tonic effect upon the nervous system. It also guards against post-partum hemorrhage, by promoting permanent tonic contractions of the uterus. In cases where the lochial discharges have been excessive, it diminishes the quantity; it also, as a rule, lessens after-pains.

b. Ergot. It may be given either by the mouth, in the form of the fluid extract, or hypodermatically, in which case ergotine should be employed dissolved in water. The dose of the fluid extract should not exceed ten minims, and should be given every fifteen minutes until uterine contractions become more energetic. One grain of ergotine represents five minims of the fluid extract; given hypodermatically, the dose would be two grains.

The following rules govern the administration of the drug in labor:

It must not be employed in the first stage; labor must be advanced and the os fully dilated; the presentation and position of the fœtus must be favorable; the birth-canal must be normal, and the drug must be given in small doses.

2. *The Faradic Current.*—Place an electrode on either side of the abdomen over the uterus, and continue the application for fifteen minutes.

3. *Manual Pressure.*—This may be applied with the patient either upon the back or upon the side. In the former position, which is the best, place the hands over the sides of the fundus and body of the uterus, and during a uterine contraction make pressure downward and backward toward the superior strait. In the latter position, the left hand, if the patient is upon the left side, is applied over the fundus and pressure made in the same direction. Manual pressure is contra-indicated if the uterus is unusually tender, or in a state of tonic contraction due to exhaustion.

Again, the birth-canal must be normal in size and the presentation and position of the fœtus favorable.

When should the forceps be applied in a labor delayed by weak uterine contractions?

After the head has descended into the pelvic cavity, if its progress be delayed for two hours we apply the forceps.

Dystocia due to the Fœtus.

Dorsal Displacement of the Arm.

How is a dorsal displacement of the arm managed in a head-first or in a head-last labor?

Head-first.—The diagnosis of this displacement is difficult, as the presentation is too high up to be reached by the examining finger. If in a given case, the uterine contractions being strong and the pelvis of normal size, the head fails to make any progress after a certain length of time, place the patient under an anæsthetic and complete the diagnosis. The arm may then be brought down, thus making a hand-and-head presentation, or—and this is the more effective plan—podalic version may be performed.

Head-last.—The diagnosis of this displacement is easier in a head-last labor. The arm may generally be liberated by carrying the trunk of the child well backward, and then introducing the finger behind the symphysis and over the shoulder; then press the elbow downward and forward. Another plan is to rotate "the child in the opposite direction to that rotation which caused the difficulty." If it is found impossible to free the arm, it may be necessary to fracture it.

Excessive Development of the Fœtus.

Premature Ossification.

How is the delivery of the fœtus managed when the bones of the head are prematurely ossified?

The indications are the same as those which guide us in all cases of disproportion between the size of the fœtus and the pelvis.

Delivery is usually accomplished with the forceps. If it is impossible by this means, embryotomy must be resorted to.

Large Size of the Body.

How is the delivery managed when the trunk of the fœtus is excessively developed?

This is very rarely a cause of dystocia, for after the head is born the body, which is compressible, as a rule, follows. If the shoulders cannot be delivered, by means already described, embryotomy must be performed.

Large Size of the Fœtal Head.

How is delivery managed when the fœtal head is excessively developed?

The indications in the management of labor are the same as those already described when the bones are prematurely ossified.

Is the induction of premature labor indicated when children of previous pregnancies have been still-born from excessive development?

Yes. This question will be more fully discussed in the chapter on induction of premature labor.

Hydrocephalus.

What is hydrocephalus? See fig. 49.

A serous effusion in the cranial cavity.

What is its etiology?

The essential cause is unknown. The following are considered as causes: Cretinism, alcoholism, syphilis, impoverished condition of the mother's blood, and marriages of consanguinity.

What is the diagnosis?

Head-first Labor.—

a. Palpation. The head will be felt larger and higher up than normal.

b. Auscultation. The heart-sounds will be heard at or above the transverse line.

c. Abdomino-vaginal touch. Fluctuation can be felt.

d. Indigation. The examining finger feels a fluctuating tumor, which becomes tense during a uterine contraction. During a pain the scalp remains smooth and there is no overriding of the bones. The cranial bones are found less firm, and more flexible; the size of the presenting part is larger than normal; the shape of the head less convex, and the sutures and fontanelles are further apart and more open.

Head-last Labor.—In most cases the diagnosis is not made until after the trunk is born, and then the arrest of the after-coming head necessitates an examination to determine the cause of delay, when the condition may be recognized.

a. Palpation. The uterus and abdomen are found to be much larger than would be the case after the expulsion of the body of the child when the head is normal in size. The uterus also contains a large round body.

b. Indigation. The examining finger coming in contact with the occipital bone recognizes the peculiarities already referred to. If the arms are extended and an effort be made to bring them down, they will be found much higher in the pelvis.

Does hydrocephalus interfere with the accommodation of the fœtus?

Yes. There is a larger proportion of pelvic and shoulder presentations.

What is the fœtal and maternal mortality?

If the life of the child is not sacrificed during labor, it, as a rule, dies early in infancy. The great danger to the mother is from rupture of the uterus; sloughing of the soft parts and exhaustion may also endanger her life. If hydrocephalus be recognized early in the labor, the maternal prognosis is favorable. Parvin teaches that when an early diagnosis is made "recovery would probably be the rule, and very few exceptions occur."

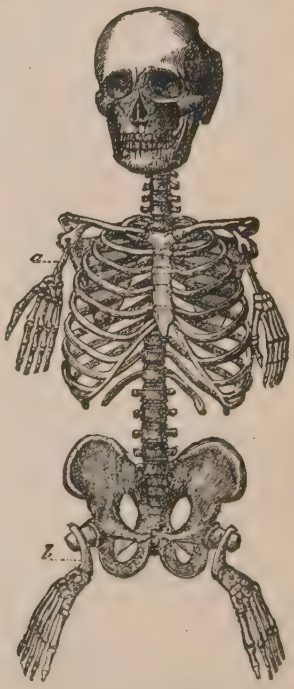
What are the indications in treatment? See fig. 50.

Head-first Labor.—If labor be delayed, puncture the head and allow the fluid to escape. Then if delivery does not occur spon-

FIG. 50.

Hydrocephalus and presentation of the pelvic extremity. (Herrgott.)

FIG. 51.



Phocomele fœtus.

taneously, make traction with the cephalotribe, cranioclast, or forceps. The latter instrument must be used with great care, as it is very liable to slip when traction is made. Lusk holds that the forceps should never be used. Some obstetricians, after puncturing the head, advise podalic version, but Parvin teaches that the operation is unnecessary, and often impossible.

Head-last Labor.—If, after making a moderate amount of traction and at the same time pressing upon the head above the pubes, the fœtus cannot be expelled, puncture must be resorted to.

If the head is too high up in the pelvis to reach with an instrument, open the spinal canal and introduce an elastic catheter up into the brain. The opening into the spinal canal should be made as close to the mother's body as possible. Some authorities detruncate and then deliver the head.

Monstrosities.

How are monsters divided?

Into 1. Single monsters. 2. Double monsters. 3. Parasite monsters.

Name and describe the single monsters. See fig. 51.

1. Ectromelic Monsters.—Where there is a want of development, more or less complete, of one or more of the extremities.

a. Phocomelus. Atrophy of the arms and thighs, but normal development of the hands and feet, forearms and legs.

b. Hemimelus. Normal development of the arms and thighs, but atrophy of the other segments of the limbs, forearms and hands, legs and feet.

c. Ectromelus. There is an arrest of development of all the segments, the extremities being mere stumps.

2. Symelic Monsters.—Where there is a fusion of the extremities in the median line, more or less complete.

a. Symelus. Where the fusion is not complete, the extremities terminating in two feet, or two hands.

b. Uromelus. Where the fusion is more complete, the extremities terminating in a single foot, or hand.

c. Sirenomelus. The extremities terminate in a point, without hands, or feet.

3. Exencephalic Monsters.—Where there is a malformation of the brain, which is placed, more or less, outside the cranium; the skull itself is also imperfectly developed.

a. Notencephalus. The brain is almost entirely external to the cranial cavity, the protrusion being situated in the occipital region.

b. Proencephalus. Where the brain protrudes through a fissure in the frontal bone.

c. Podencephalus. Where the brain protrudes through a fissure in the vault of the skull; the tumor is usually pedunculated.

d. Hyperencephalus. This variety of monster is practically a highly exaggerated example of podencephalus. The superior part of the cranium is almost entirely absent, and the upper part of the occipital bone is lacking. The brain is placed almost entirely outside of the cranial cavity.

e. Iniencephalus. Where the brain protrudes through an opening in the occipital bone, associated with spinal fissure. This monster is practically a notencephalic fœtus plus the spinal fissure.

f. Exencephalus. The brain protrudes in very great part outside of the cranial cavity, and is associated with vertebral fissure. This monster is practically a hyperencephalic fœtus plus the spinal fissure.

g. Pseudencephalus. The vault of the cranium is absent and the brain-substance is almost entirely lacking. Instead of the brain there is a vascular tumor, deep red in color, which is derived from the *pia mater*. "The head has neither forehead nor vertex, is sunk between the shoulders and surmounted by a blood-tumor." (Saint-Hilaire.)

4. Anencephalic Monsters.—The brain and cranial vault are absent. These monsters are practically pseudencephalic fœtuses minus the vascular tumor.

a. Derencephalus. The brain and cranial vault are absent and the occipital foramen is lacking. There is also an arrest in development of the cervical vertebræ and also, occasionally, of the upper dorsal.

b. Anencephalus. There is an arrest in development of the entire vertebral column, which is open and forms a furrow. The spinal cord is absent. This variety of monster is practically an exaggerated example of a derencephalic fœtus.

5. Cyclocephalic Monsters.—Where there is an absence, or more or less atrophy, of the nasal apparatus; the eyes are rudimentary and approach the median line, occasionally they are fused into one.

a. Ethnocephalus. The nose is not entirely absent. There are two incompletely formed nostrils, or only one. There are two eyes.

b. Cebocephalus. The nose is entirely absent. In this, as in the preceding variety, there are two eyes.

Fig. 51*a*.

Rhinocephalus.

c. Rhinocephalus. The nose resembles a tube or trunk, and the eyes, which are usually fused into one, occupy the median line, and are situated below. The nose, as a rule, has only one opening.

d. Cyclocephalus. Complete atrophy of the nose, with a single eye situated in the median line.

6. Acephalic Monsters.—Where there is a complete absence of the head.

Name and describe the double monsters. See fig. 52.

1. Ensomphalic Monsters.—"These fœtuses are each practically complete although united together, and are able to accomplish independently almost all vital functions. Each has its own umbilicus, and, during intra-uterine life, its umbilical cord." (Saint-Hilaire.)

a. Pygopagus. Where the buttocks, or backs are united. These monsters are viable.

b. Metopagus. They are united by their heads, forehead to forehead, vertex to vertex.

c. Cephalopagus. The twins are also united by their heads as in the preceding variety, but they are fused vertex to forehead, forehead to vertex.

2. Monomphalic Monsters.—"These are characterized by the union of two complete individuals at a common umbilicus."

a. Ischiopagus. Where they are united by the ischiæ.

b. Xiphopagus. Where they are united by the xiphoid cartilages or epigastrium. The Siamese twins are an example of this variety.

c. Sternopagus. Where the twins are united by the sternums.

d. Ectopagus. Where there is a fusion of the two chests. The thoracic walls are unequally developed.

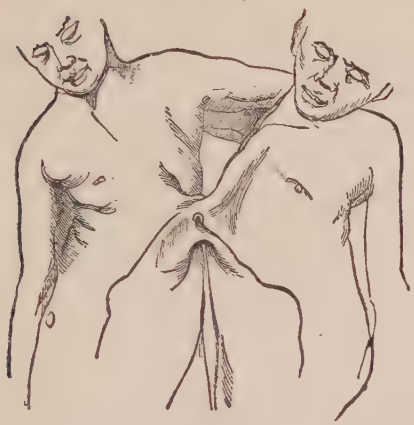
e. Hemipagus. The same as the preceding variety, except that the union extends to the mouths, which have a single cavity.

3. Sycephalic Monsters.—Where there is an intimate fusion of the two heads.

a. Janiceps. One large head with two faces, looking in opposite directions. A common thorax and four superior extremities.

b. Miopes. One face is fully developed, while the other is imperfect. The latter consists of two ears, or only one, and above it is placed a single eye, more or less imper-

FIG. 52.



Xiphopage—The Siamese twins. (Pancoast.)

FIG. 53.

Heteropages. (Licetus.)

fectly developed. As in the preceding variety, each face looks in opposite direction.

c. Synotus. This monstrosity is an exaggeration of the preceding one. All parts of the face are absent, except the ears, which are placed very near one another, or fused.

4. Monocephalic Monsters.—This variety consists of a head, without any exterior trace of union, surmounting two bodies, fused in a more or less intimate manner, and for a greater or less extent.

a. Deradelphus. The bodies are united above and separated below the umbilicus. There are four lower and three or four upper extremities.

b. Thoradelphus. The same as the preceding, except that there are only two upper extremities.

c. Ileadelphus. The body is united above the umbilicus, and below it as far as the pelvis. There are four lower and two upper extremities.

d. Synadelphus. The same as the preceding, except that there is a single pelvis. There are, also, four upper and four lower extremities.

5. Sysomic Monsters. — Where there is more or less complete union of the two bodies, while the two heads remain separate.

a. Psodymus. There are two thoracic cavities and two heads. The abdominal and pelvic cavities are united. There are two lower extremities, but occasionally a third rudimentary one is present.

b. Xyphodymus. The same as the preceding, except that the union is higher, including the lower part of the thorax.

c. Derodymus. A single body with two necks and two heads. As a rule, there are two upper and two lower extremities, although additional rudimentary limbs may be present.

6. Monosomic Monsters.—These monsters have practically a single body with two heads.

a. Atlodymus. Two heads and a single body. The organization of the body is strictly single.

b. Miodymus. This monster differs from the preceding in that the two heads are united posteriorly, the union between

the necks not being complete in all cases. The number of ears varies.

c. *Opodymus.* The union between the heads is more exaggerated than in the preceding variety. The faces are closer together, and the mouths are either separate, or have a common opening. In either case the mouth posteriorly is always united. The tongue is always joined posteriorly, even when it is double anteriorly. The number of eyes varies.

Name and describe the parasite monsters. See fig. 53.

1. *Heteropagus.* — There are upper and lower extremities and one head. The parasite is attached to the anterior abdominal wall of the principal fœtus.

2. *Heteradelphus.* — The head of the parasite is absent, and the body, with or without the upper extremities, is attached to the principal fœtus at the level of the epigastrium.

3. *Epicome.* — Where there is an accessory head united by the summit to the head of the principal fœtus.

4. *Epignathus.* — Where the parasite is attached to the superior maxillary bone.

5. *Hypognathus.* — Where the parasite is attached to the inferior maxillary bone.

6. *Pygomelus.* — Where the parasite is inserted into the hypogastric region.

Dystocia in Plural Deliveries.

What are the predisposing causes of dystocia in plural births?

The large size of the pelvis, or the small size of the fœtuses, or their being contained in a single sac.

What are the determining causes?

The injudicious use of ergot, or interference with the progress of labor, as by premature rupture of the membranes.

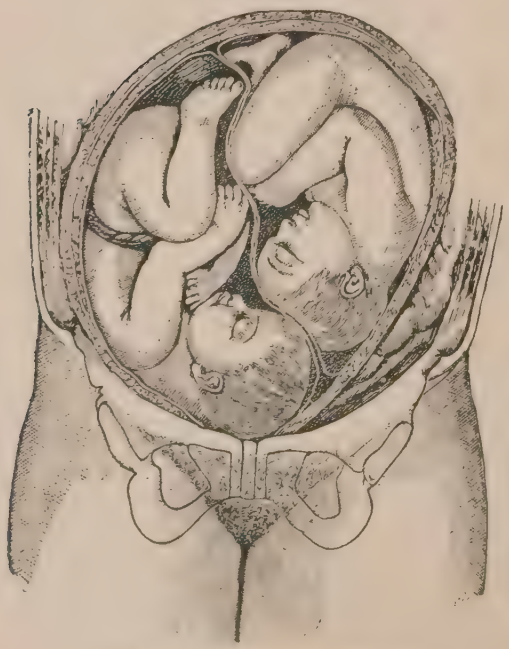
In what ways may delivery be arrested in twin births? See figs. 54 and 55.

1. Both heads may present at the superior strait (rare).
2. Both heads may present and one descend into the pelvis

FIG. 54.

One fœtus presenting by the breech, the other by the trunk.

FIG. 55.



Twin pregnancy, both heads presenting.

somewhat in advance of the other, the last head being forced against the neck of the first child.

3. The body of the first presents by the breech and is delivered, and then the head of the second child entering the pelvis becomes interlocked with the head of the first. The interlocking may be chin to chin, occiput to occiput, or chin to occiput.

4. The first child descends by the head, and the second by the breech, the bag of waters of the latter protruding in advance of the former obstructs its descent.

5. The fœtuses may present by the breech, and the feet of both descend at the same time into the pelvic cavity.

6. The first fœtus descends by the head, and the second is transverse. The head of the former, after descending into the pelvic cavity, may be arrested by the neck of the latter getting under the shoulder and locking against the neck.

7. The first fœtus descends by the breech, and the second is transverse. After delivery of the body of the former, the head may be arrested by the trunk of the latter.

8. The first child may be transverse, and the second present by the breech The limbs of the second child passing over on each side of the body of the first, descend into the vagina—*i. e.*, the former twin is sitting astride the latter.

How is the arrest of labor, occurring in the delivery of twins, managed?

The life of the mother is the first consideration, and next the safety of the fœtuses. If both twins cannot be delivered alive, our efforts should be directed toward saving one of them.

If the bag of waters of the second child is in advance of the head of the first, obstructing its descent, rupturing the membranes will relieve the difficulty.

In all cases where interlocking of the fœtuses is the cause of the arrest of delivery, the first indication is to endeavor, by external and internal manipulations, to decompose the wedge by unlocking them. Failing in this, delivery may be effected with the forceps; but if this is unsuccessful, embryotomy must be resorted to.

Where the first child presents by the breech, and the second by the vertex, if labor is arrested after the delivery of the trunk of

the former, by the interlocking of the two heads, the woman should be placed in the knee-chest position, the body of the first child supported with one hand, while the other introduced into the vagina pushes up the head of the second. If unlocking is impossible, then apply the forceps to the head of the second child, and endeavor to deliver. As a rule, however, unless the pelvis is large, and the fœtuses small, one of the twins will have to be sacrificed before the wedge is decomposed. This must be accomplished by detaching the head of the first child, or by performing craniotomy (decapitation of the first child).

Where both heads present simultaneously at the inlet, introduce the hand into the vagina and push one of the heads out of the way, at the same time assisting the manipulation with the other hand externally. Then apply the forceps to the other head, so as to cause it at once to engage.

If both fœtuses present by the vertex, one somewhat in advance of the other, so that delivery of the first child is prevented by the pressure of the head of the second, against its neck or thorax, an endeavor should be made to push up the second head. Failing in this, apply the forceps to the first head. If delivery cannot be accomplished by the forceps, craniotomy must be resorted to; the child in advance being the one sacrificed.

Prolapse of the Funis.

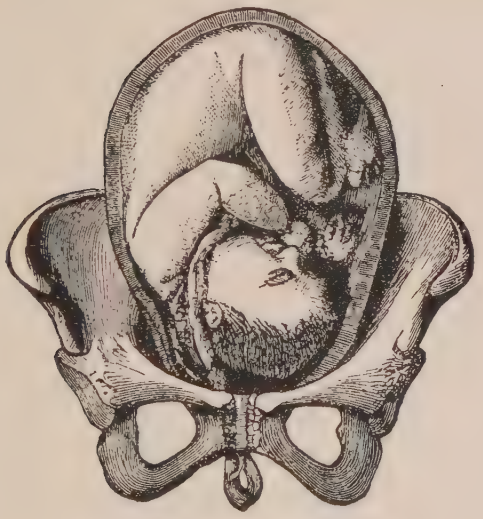
What is the frequency of prolapse of the cord? See fig. 56.

Authorities differ. Probably it occurs once in about 225 labors.

What are the causes of the prolapse?

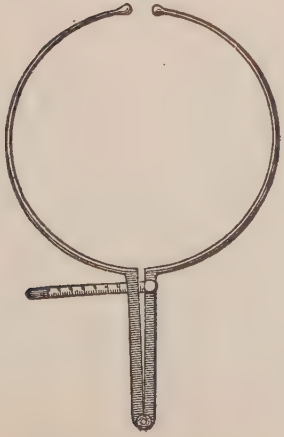
Prolapse of the cord only occurs when the presenting part fails to occupy completely the lower segment of the uterus; hence the accident is more frequent in presentations of the face, shoulder, or pelvis, than when the vertex presents. Again, the small size of the fœtus, the oblique position of the uterus, deformities of the pelvis, especially when it is contracted, and multiple pregnancies are predisposing causes. Among other causes may be mentioned hydramnios, premature rupture of the membranes, great length of the cord, or marginal attachment, placenta prævia, and prolapse of the fœtal extremities.

FIG. 56.



Prolapse of the cord.

FIG. 57.



Baudelocque's pelvimeter.

What is the diagnosis of prolapse of the cord?

Before Rupture of the Membranes.—The examinations should be made in the interval of uterine contractions. The examining finger feels a round, smooth, compressible object, which can be moved about in different directions. It presents to the touch none of the characteristics of a hand or foot, therefore the diagnosis is, as a rule, devoid of difficulty. If the fœtus be alive, pulsations may be felt through the membranes.

After Rupture.—The diagnosis is without difficulty, there being nothing that the cord can be mistaken for.

What is the prognosis?

There is no danger to the mother, but the results of the accident are very grave to the child. The danger to the child depends upon the presentation. Thus, in a shoulder presentation, there is little or no danger, and in a breech the prognosis is good; Charpentier, however, holds that the accident is grave to the child in a presentation of the pelvis. The most dangerous cases are those where the accident occurs in a head presentation. The favorable conditions in prolapse of the cord are, a large pelvis, the funis occupying the sides of the pelvis, and the preservation of the bag of waters until dilatation of the cervix is completely effected. As unfavorable conditions may be mentioned, a contracted pelvis, placenta prævia, and premature rupture of the bag of waters.

What is the treatment?

The cause of death of the fœtus is asphyxia from pressure upon the cord. Recognizing the cause of death the indication in the treatment is obvious.

Head Presentations.—Before Rupture. The patient should be placed in the latero-prone position, upon the side opposite to the prolapse. All bearing-down efforts are forbidden, and the premature rupture of the membranes guarded against. The membranes may be supported by introducing a Barnes's dilator into the vagina and moderately distending it. If, upon auscultation, there are signs of failure in the fœtal circulation, endeavor to push up the cord through the membranes. If this can be done, rupture the

membranes, and bring the head well down so as to fill the lower uterine segment.

After Rupture. If the cervix is completely dilated, the uterine contractions strong, and the head rapidly descends, leave the case to nature. If, however, the progress of labor is slow, apply the forceps. When the head is above the inlet and movable, the forceps are contra-indicated. Delivery in such cases must be accomplished by version, or reposition of the cord effected; the latter procedure should be tried first. In all cases of prolapse of the cord the condition of the child must be from time to time determined by auscultation. When the case is left to nature, the cord should be placed near one or the other of the sacro-iliac joints, where it will be least pressed upon.

Face Presentations.—Podalic version is indicated, as reposition of the cord is not likely to succeed.

Presentations of the Feet.—The cord is not pressed upon before the feet can be reached and traction made.

Breech Presentations.—If the circulation in the cord is interfered with, bring down a leg.

Shoulder Presentations.—There is no special indication for treatment, except that of the abnormal presentations.

If the pulsations in the cord have ceased, it must not be taken for granted that the child is dead, as the heart may continue its action for several minutes after the circulation in the umbilical vessels has ended. If the child be dead, the delivery should be managed without reference to the prolapsed condition of the cord.

By what methods may reposition of the cord be effected?

By the manual, instrumental, or postural treatment.

Describe these methods.

Manual Treatment.—Push the cord beyond the presenting part with the fingers, and keep it in that position until a uterine contraction comes on, and then gently withdraw the hand from the vagina; or, after it is replaced place a sponge between the presenting part and the uterine wall. In some cases the cord may be placed around one of the fœtal extremities.

Instrumental Treatment.—Take a piece of tape, double it and pass it through a firm rubber catheter, so that the loop emerges at

the eye of the instrument. Next pass a loop of the prolapsed cord through the end of the tape. Now draw upon the free ends of the tape with sufficient force to keep the cord from slipping, care being taken not to cut off the circulation. After the free ends of the tape have been tied into a knot, introduce the stylet and carry the catheter and cord up into the uterine cavity. The stylet is now withdrawn, the catheter being allowed to remain until the head has descended.

Postural Treatment.—Place the patient in the knee-chest position, and in the interval of a pain introduce the hand into the vagina, seize the cord and carry it beyond the presenting part, and at the same time support the uterus with the other hand placed externally. As the head descends and occupies the lower segment of the uterus, the hand should be gradually withdrawn. The patient is then placed upon her side with the buttocks elevated.

Deformities of the Pelvis.

How are deformities of the pelvis divided?

Into 1. Deformities of position.
2. Deformities of size.
3. Deformities of forms.

What are the deformities of position?

The normal obliquity of the pelvis is either increased or diminished. If it be increased, the plane of the inlet becomes more or less vertical, while the axis assumes a horizontal position. If, on the other hand, the obliquity be decidedly diminished, the plane of the superior strait becomes horizontal.

What are the deformities of size?

These pelves are either increased or lessened in size; the change being symmetrical.

1. *The pelvis æquabiliter justo-major*, or the symmetrically enlarged pelvis.

2. *The pelvis æquabiliter justo-minor*, or the symmetrically contracted pelvis.

   a. The infantile pelvis. This pelvis has the characteristics of the sex, but there has been an arrest in development. This is a rare form.

b. The dwarf's pelvis. This variety is very rare. It has the characteristics of the female pelvis, but is smaller.

c. The masculine pelvis. This has the characteristics of the male pelvis.

What are the deformities of form?

1. Those pelves in which the vertical measurements are increased, without any change in the horizontal.

2. Those pelves in which the vertical measurements are diminished. These pelves, as a rule, are asymmetrically deformed, and are divided into three classes, viz.:

a. Those principally contracted in the antero-posterior diameter.

b. Those principally contracted in the transverse diameter.

c. Those principally contracted in the oblique diameter.

Name the pelves principally contracted in the antero-posterior diameter.

1. The simple flat pelvis.
2. The rachitic flat pelvis.
3. The generally contracted flat pelvis.
4. The spondylolisthetic pelvis.
5. The pelvis flattened by double laxation.
6. The lumbo-lordotic pelvis.

Name the pelves principally contracted in the transverse diameter.

1. The osteomalacic pelvis.
2. The ankylotic transversely contracted pelvis. (Robert's).
3. The kyphotic transversely contracted pelvis.

Name the pelves principally contracted in the oblique diameter.

1. The ankylotic obliquely contracted pelvis. (Naegele's).
2. Coxalgic pelvis.
3. The scoliotic pelvis.

In what way may an increased obliquity of the pelvis interfere with labor?

The advance of the head may be retarded by pressing against the superior surface of the symphysis pubis.

How is the difficulty overcome?

By placing the patient in a half-sitting position, by elevating the hips and the upper part of the body, or if she is upon the side, have her bend the back forward and flex her thighs upon the pelvis. Walcher's position may also be valuable.

How is the difficulty overcome if lessened obliquity of the pelvis interferes with labor?

By raising the lumbar region and placing the coccyx lower.

What are the mechanism and treatment of labor in the justo-minor pelvis?

The head does not descend into the pelvic cavity in the latter part of pregnancy, but is at the superior strait when labor begins. The head descends strongly flexed, the biparietal diameter being in relation with the conjugate, and the suboccipito-bregmatic with the transverse. The head does not undergo anterior rotation, but delivery occurs by the occiput passing over the perineum. The caput succedaneum is larger than in normal labor.

If the antero-posterior diameter of the inlet measures 9¼ cm. (3.5 in.), induce labor at eight months; if 8 cm. (3.1 in.), the indication is positive. If below 8 cm. (3.1 in.), the choice lies between the Cæsarean section, symphysiotomy, and embryotomy. If below 6 cm. (2 in.), perform the Cæsarean section. Some authorities consider the indication for Cæsarean section absolute when the conjugate measures 6½ cm. (2.5 in.), or less.

The forceps should not be applied until the head is moulded. If the head presents, podalic version is contra-indicated.

If the contraction is principally in the superior strait, the mechanism of labor and its treatment, after the head has entered the pelvic cavity, correspond with a normal labor.

What are the mechanism and treatment of labor in the simple flat and in the rachitic flat pelvis?

The head does not enter the pelvic cavity in the latter part of pregnancy as is usual in primigravidæ, but in some cases it may turn aside at the superior strait, thus increasing the proportion of shoulder presentations. If the head presents when labor occurs, the sagittal suture lies in the transverse diameter. The head is

partially deflected, and the fontanelles (anterior and posterior) are on the same level. The transverse diameter is in relation with the conjugate, and the occipito-frontal with the transverse. The sagittal suture is directed toward the promontory. The anterior parietal bone now becomes the fixed point and pivots against the pubes, while the posterior parietal descends below the promontory. In order to accomplish this descent, the transverse diameter of the fœtal head must be shortened. In some cases the posterior parietal bone may become fixed against the promontory, and the anterior parietal descend first. After the head has descended into the cavity, delivery is effected by the normal mechanism of labor. In a pelvis where there is a marked projection of the promontory, giving to the superior strait the form of the figure 8, the head may descend through one side of the inlet; of course, this can only occur when the head is very small and the pelvis originally very wide, the mechanism being the same as in the generally contracted pelvis.

In breech presentations, the feet, as a rule, descend first; if the deformity be slight, the delivery of the body is followed by that of the head in a transverse position and flexed.

In the treatment of labor care should be taken to prevent premature rupture of the membranes. If the head fails to pass the inlet, the indication is to deliver by the forceps or version. The same rules guide us in the indications for the Cæsarean section, symphysiotomy, or embryotomy, as already referred to, under the head of the generally contracted pelvis.

How is the diagnosis of pelvic deformities made? Fig. 57.

1. *Probable Signs.*—

   a. History of patient. Inquire as to the diseases of infancy and childhood; the age when walking began; as to any congenital or acquired deformities; as to injuries of the spine or pelvis, and whether a luxation of one of the femurs occurred in early life. If the woman has previously been pregnant, inquire as to her labors, whether natural or artificial; also as to whether the child was delivered living or was still-born.

b. *Appearance of the body of the patient.* See if the hips are on the same level, or if any ankylosis of the joints exists. Examine the spine, and if any abnormal curvature exists inquire when it made its appearance. If the deformity occurred in infancy, the disease was probably rickets and the lower limbs will generally be found bent, and, as a rule, a deformity of the pelvis exists. On the other hand, if the deformity first manifested itself in late childhood, it was not caused by rickets, and the pelvis is probably normal. If the patient is lame, inquire as to the cause and the age when the deformity first occurred.

2. *Certain Signs.*—These signs are determined by pelvic measurements or pelvimetry. The instrument with which these measurements are made is called the pelvimeter. Before using the pelvimeter, the accoucheur should determine, with his hands, the position of the hips, the size of the iliac bones, the depth of the iliac fossæ, the width and curve of the sacrum, and the position of the pubic symphysis.

1. *External Pelvimetry.*—

a. Between the anterior superior processes of the iliac bones, 26 cm. (10¼ inches).

b. The greatest distance between the iliac crests, 29 cm. (11½ in.).

c. Between the great trochanters, 31 cm. (12¼ in.).

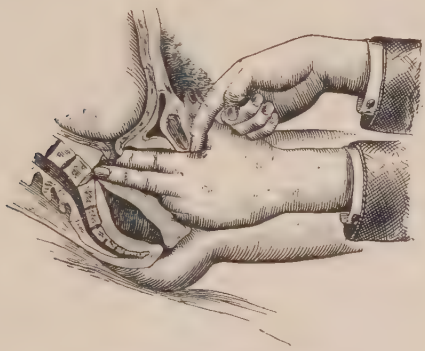
If these measurements are normal, there is no lessening in the transverse diameters of the pelvis.

d. The external conjugate, 20¼ cm. (7.9 in.). This diameter is determined by placing one of the knobs of the pelvimeter over the spinous process of the last lumbar vetebra, and the other upon the middle of the anterior surface of the pubic symphysis. By deducting 9¼ cm. (3.6 in.) from the measurement of the external conjugate, we approximately determine the true conjugate. If the external conjugate is decidedly lessened, we know that the true conjugate is decreased.

e. The circumference of the false pelvis is 90 cm. (35.5 in.). To determine this measurement we place the end of a tape-measure at the spinous process of the last lumbar vertebra, and carry the tape along the crest of the iliac bone

to the middle of the pubic symphysis; in the same way the other side of the pelvis is measured. By adding together the results of these measurements the circumference of the entire pelvis is determined. If one side of

FIG. 58.



Measuring the diagonal conjugate.

the pelvis measures more than the other, it is asymmetrical. We may also ascertain any want of symmetry of the pelvis by "measuring the distance of the trochanter of one side, to the middle of the iliac crest of the other," and *vice versâ*.

2. *Internal Pelvimetry.*—See fig. 58.

   a. *The diagonal conjugate.* This diameter is taken from the posterior edge of the symphysis pubis to the sacro-vertebral angle. The index and middle fingers of the left hand are introduced into the vagina and carried upward and backward until they touch the sacro-vertebral angle. Then the nail of the index finger of the other hand marks the point of contact of the internal hand with the subpubic ligament; the fingers are now withdrawn from the vagina, and the distance from this mark to the tip of the finger measured. To determine the true conjugate we subtract from this measurement five-tenths to seven-tenths of an inch, if the height of the symphysis is one inch and

a half. This subtraction will, of course, vary somewhat in the different deformities of the pelvis.

Measurements of the Outlet.—These diameters are of less importance than those just described. To determine the antero-posterior diameter, place the patient upon her side (left), and with the index finger of the right hand introduced into the vagina, while the thumb is placed externally, include between them the sacro-coccygeal joint. The tip of the finger is kept pressed against the joint while the point of contact with the subpubic ligament is marked by the nail of the index finger of the left hand. The finger is then withdrawn and the distance measured. The antero-posterior diameter may also be measured by the pelvimeter. One knob is placed externally over the sacro-coccygeal joint, while the other is pressed against the under surface of the symphysis pubis. The actual diameter is then obtained by subtracting from this measurement 1 to 1.5 centimeters.

The transverse diameter is obtained by placing the knobs of the pelvimeter upon the tuberosities of the ischiæ and deducting from the distance measured between these two points, 1–2 centimeters.

What is the diagnosis of the generally contracted pelvis?

All of the measurements are found to be below normal. In the masculine pelvis, however, owing to the thickness of the bones, the distances between the iliac crests and between the anterior superior spinous processes of the iliac bones are found to be but slightly altered, or even normal.

What is the diagnosis of the simple flat pelvis?

The transverse diameters and the circumference of the false pelvis are normal; the former may be slightly increased, and the latter slightly decreased, but symmetrical. The external conjugate is always lessened, the true conjugate, in most cases, being 8 cm. (3.1 in.).

What is the diagnosis of the simple flat rachitic pelvis?

There is a history of rickets and evidences of the disease in other

portions of the skeleton. The distances between the anterior superior spinous processes and between the iliac crests are equal; in some cases the distance between the former exceeds that between the latter. The external conjugate is always shortened; the true conjugate is diminished. The antero-posterior as well as the transverse diameters of the pelvic outlet are large, compared with the deformity at the superior strait.

Rupture of the Uterus.

What are the causes of rupture of the uterus?

The chief cause is thinning of the lower uterine segment. Other causes are direct violence, attrition, and the rupture of a one-horned uterus.

What are the conditions necessary for a rupture to occur?

Malpresentation or undue size of the fœtus (hydrocephalus), or uterine or pelvic deformity.

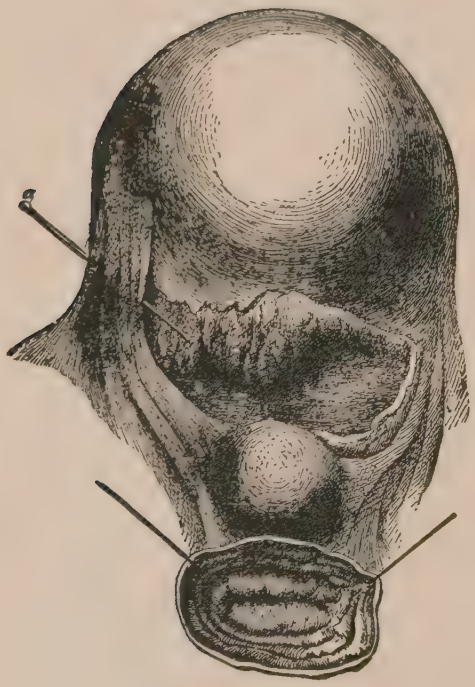
Explain the mechanism of rupture due to thinning of the lower segment. See fig. 59.

In a normal labor the upper segment (fundus and body) of the uterus thickens, while the lower is thinned and stretched. The boundary line between these two portions of the uterus is marked by a ridge, which, however, is not the internal os uteri, but is due to a retraction of the muscular fibres of the body and fundus. This ridge is termed the "contraction ring," or ring of Bandl, or Schroeder. This ridge or contraction ring, during a normal labor, is situated on a level with the pelvic inlet. Now suppose, instead of the normal resistance to the advancing presentation, one or other of the conditions necessary for rupture to occur exists; we will then have the uterine efforts increased, and the contraction ring will be withdrawn upward until it reaches above the pubes, or in the neighborhood of the umbilicus. Thus, the lower segment of the uterus will be greatly thinned and stretched, while the fundus will be thickened.

What is the diagnosis of threatened rupture? See fig. 60.

1. The contraction ring is high up, at or near the umbilicus.

FIG. 59.



Rupture of the uterus.

It is higher on the left than on the right side, on account of the right obliquity of the uterus.

2. Above the contraction ring the uterus is thickened; below, it is stretched and thinned.

3. The round ligaments are greatly thickened, and feel like tense cords.

4. There is great pain in the supra-pubic region.

5. The labor is protracted, and the presenting part fails to descend.

FIG. 60.

Thinning of the lower uterine segment.

What is the diagnosis of rupture?

If the rupture occurs suddenly, uterine contractions cease and symptoms of collapse set in; signs of internal hemorrhage and shock intervene, and blood escapes from the vagina. There is also a recession of the presenting part. If the child escapes into the abdominal cavity, the uterus will be found to be empty, and the fœtal outlines can be traced by palpation.

If the rupture be incomplete, the symptoms are less pronounced. The presenting part does not recede, and uterine contractions may continue.

What are the causes of death following rupture?

Septicæmia, shock, and hemorrhage.

What is the prophylactic treatment?

The accoucheur should guard against this accident by the recognition and removal of the cause. The treatment of undue size (hydrocephalus) and malpresentations of the fœtus and pelvic deformities has been discussed elsewhere. If the fœtus be dead and the shoulder presents, decapitation is indicated if symptoms of threatened rupture are present.

What are the indications in the treatment of rupture?

1. Escape of the child entirely or chiefly into the abdominal cavity. The indication is abdominal section.

2. Child partly within and partly without the uterus. The indications are:

a. Deliver by the natural passages if it can be accomplished without enlarging the uterine opening; or,

b. If this cannot be done, then perform abdominal section.

3. If the child is entirely within the uterus, deliver by the natural passages.

Abdominal section is probably indicated in all cases of complete rupture, even where extraction *per vias naturales* has been accomplished, unless uterine retractions close the laceration.

Inversion of the Uterus.

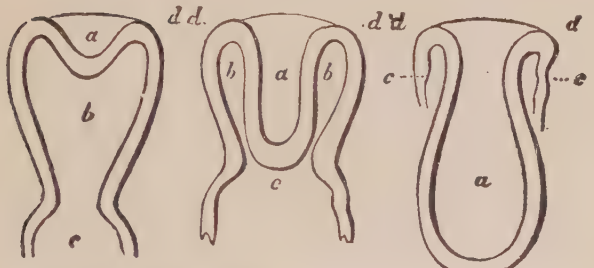
What is inversion of the uterus?

The fundus becomes more or less depressed, so that the serous covering is internal while the mucous coat is external; "the organ is up-side down and wrong-side out."

How many degrees of inversion are recognized? Fig. 61.

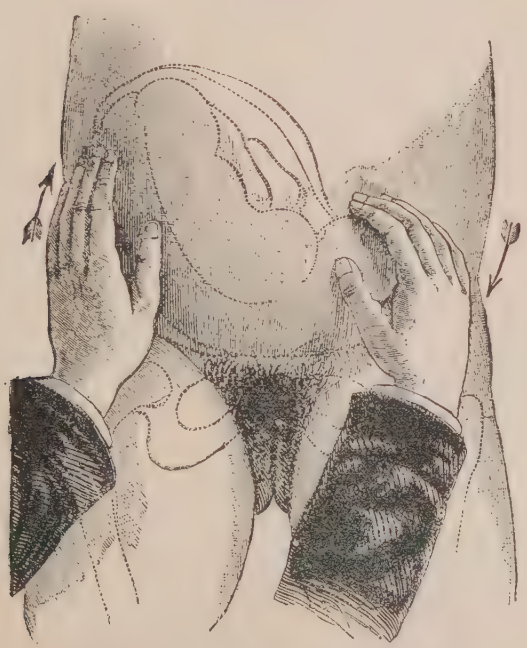
Three, viz., 1, simple depression of the fundus; 2, partial inversion, *i. e.*, where the fundus descends and is surrounded by the

FIG. 61.



Different degrees of uterine inversion. *a*, fundus uteri inverting; *b*, uterine cavity; *c*, vagina; *d*, upper border of the cap formed by the inversion.

FIG. 62.



External cephalic version. Transverse presentation. (Pinard.)

cervix; 3, complete inversion, or where the uterus protrudes outside of the vulva.

What are the causes?

Inversion of the uterus is always preceded by paresis of a portion of the uterine muscles, some authorities holding that the paralysis is at the placental site. Among the immediate causes are, pressure upon the fundus over the abdomen, and traction upon the cord, the result either of a short cord or delivery in the erect position, or to interference on the part of the accoucheur. Violent bearing-down efforts will also cause the accident under favorable conditions.

What are the symptoms of acute inversion?

1, pain; 2, shock; 3, hemorrhage.

The more sudden the inversion the greater the pain. The hemorrhage may or may not be profuse.

What is the diagnosis?

There will be found in the vagina, or projecting from the vulva, a large, soft, globular tumor, livid red in color, which is limited above by a constriction, the cervix uteri. The placenta may or may not be adherent to the tumor. Palpating over the hypogastrium the absence of the uterus will be noted.

An inverted uterus may be mistaken for a fibrous polypus, but this error can be guarded against by a careful manual and visual examination. The bladder should in all cases be emptied with a catheter.

What is the prognosis?

The prognosis depends upon the rapidity with which the uterus is restored. The greater the delay the more difficult the reduction becomes, and the more serious the condition of the patient. The causes of death are, shock, hemorrhage, and inflammation, or gangrene of the uterus.

What is the treatment?

If the placenta is adherent, remove it, and at once reduce the uterus to its normal position. The following methods are advised to effect reduction:

1. *Central Taxis.*—Pressure is made against the fundus of the uterus with the fingers in the form of a cone, or with the fist.

2. *Peripheral Taxis.*—Rest the fundus in the palm of the hand, and place the fingers and thumb along the sides of the body of the uterus, and insert them into the constriction at the cervix. Then gradually stretch the cervical ring, at the same time endeavoring to glide the body of the uterus past the constriction. By this method we return first that part of the uterus which escaped last.

3. *Lateral Taxis.*—The uterus is grasped by the hands, the fingers making counter-pressure, while the thumb depresses the opposite side at the point of constriction. The thumb, by increasing the depression, sinks further and further, until the entire mass is reduced.

4. *Noeggerath's Method.*—This "consists in placing the index finger on one cornu of the uterus, and the thumb on the other, and in endeavors made to push in first one and then the other."

In performing taxis counter-pressure must be made with the disengaged hand, either above the pubes, or by two fingers introduced into the rectum. In all cases of recent inversion the rule is to use the hands, and not instruments, in effecting reduction. After reduction has been accomplished, the subsequent treatment is that of uterine atony (intra-uterine tampon, ergot).

Post-partum Hemorrhage.

How is post-partum hemorrhage divided?

Into 1. Primary hemorrhage, within six hours after delivery.

2. Secondary hemorrhage, subsequent to the first six hours, and before the end of one month.

Primary Hemorrhage.

What are the causes of primary post-partum hemorrhage?

Uterine inertia is the prime cause. Inertia may depend upon great distention of the uterus (polyhydramnios, twins, etc.), a rapid or slow labor, a feeble constitution, albuminuria, anæmia, emotional causes, a predisposition to hemorrhage in certain women, and imperfect development of the muscular fibres of the uterus.

Neoplasms of the uterus, tears, and inversion, are also causes of hemorrhage.

What are the symptoms?

As a rule, there are no precursory symptoms. In some cases, however, there may be a slight increase in the rate of the pulse, the patient being restless, and complaining of thirst. The hemorrhage usually comes on suddenly and without warning. It may be internal or external, usually both. Palpating over the abdomen the examining hand no longer feels a hard, round, resisting body, but the uterus is found enlarged, soft, and relaxed. In some cases it is impossible to outline the uterus. The patient, unless treatment be promptly resorted to, rapidly sinks, and dies from the loss of blood.

What are the indications for treatment?

1. *To Lower the Patient's Head.*—Take away the pillow and bolster and raise the foot of the bed.

2. *To Excite Uterine Contractions.*—The most prompt and efficient method is the injection of hot water (110° F.) directly into the cavity of the uterus by means of the Davidson or fountain syringe. While waiting for the hot water and syringe introduce one hand into the cavity of the uterus, and with the other make pressure upon the abdomen, thus compressing the uterus between the two hands. A better plan, however, is to throw the uterus into a position of strong anteflexion (Breisky's method). This is accomplished by introducing one hand into the vagina, carrying it upward into the posterior cul-de-sac, and fixing the lower uterine segment. The other hand is pressed deep down through the abdominal walls behind the fundus, which is then pushed forward as far as possible. While uterine contractions are being excited a hypodermatic injection of ergot should be given by an assistant.

3. *To Overcome the Immediate Effects of the Hemorrhage.*—Sulphuric ether should be given hypodermatically, and compression made upon the abdominal aorta. The blood may also be forced out of the lower extremities into the heart and brain by means of bandages (auto-transfusion). It may also be necessary to resort to transfusion of blood, or milk, or saline solution. Grandin advises the following formula: Chloride of sodium 60 grains, chloride of potass. 6 grains, phosphate of soda 3 grains, carbonate of soda 20 grains, distilled water to 20 ounces, the whole heated to 90° F.

4. *Other Means to Excite Uterine Contractions.*—The faradic current is one of the most scientific and prompt means to stimulate contractions of the uterus. Among other remedies may be mentioned the application of cold (ice applied to the abdomen or introduced into the uterus), and the injection into the uterine cavity of salts of iron. A pocket-handkerchief saturated with vinegar and carried up into the uterine cavity is strongly recommended by Penrose.

5. Tears of the lower birth-canal require immediate tamponade and subsequent suturing with catgut.

What is the after-treatment of post-partum hemorrhage?

This consists in the administration of opium and ergot. The diet should be nourishing, and at first given in small quantities. If the stomach rejects food, nutrient enemata are called for. In some cases alcohol in some form is indicated. Compression of the uterus should be made by means of towels.

Secondary Hemorrhage.

What are the causes of secondary post-partum hemorrhage?

The causes already given for primary may also produce secondary hemorrhage. Usually, however, a secondary hemorrhage is due to a retention of a part of the placenta or membranes, or to a placenta succenturiata. Sometimes a displacement of the uterus will give rise to the disorder, or the displacement of a thrombus.

What is the treatment?

The routine treatment is the same as that already described for a primary hemorrhage. Correct any displacement of the uterus which may exist as a cause, or empty the uterine cavity of any foreign substances which it may contain. Ergot should be given for several days. The after-treatment is the same as that of primary hemorrhage.

Puerperal Septicæmia.

What is puerperal septicæmia?

"An acute febrile affection, heterogenetic and contagious, attacking women in childbirth."

What is the cause of septicæmia?

The septic inoculation of wounds of the uterus or vulvo-vaginal canal by a poison introduced from without, the exact nature of which is not known.

Why is septicæmia more frequent during the winter season?

On account of a want of personal cleanliness and proper ventilation.

Why is septicæmia more frequent in primiparæ?

Because the labor is longer, there is more interference on the part of the accoucheur, and also on account of the greater liability to tears of the soft parts.

Under how many forms may septicæmia be studied?

Three: 1, benign form (*saprœmia*); 2, grave form; 3, late form.

Describe the symptoms and course of the benign form.

Time of Occurrence.—It usually begins about the third day; it may be later or earlier.

Chill.—As a rule, the disease begins with a chill, more or less severe.

Fever.—The chill is followed by a fever, the temperature reaching 104° F., or higher; it then falls to 102.5°. The temperature remains at this point, with an evening rise, for seven to ten days.

Lochia.—The flow is diminished or arrested, and, as a rule, offensive.

The Secretion of Milk.—The secretion of milk is lessened or arrested. It is prevented if the disease begins before the third day.

Pain.—Severe pain is felt on pressure in the lower portion of the abdomen.

Uterus.—There is an arrest of involution; the uterus being large and soft. In some cases a swelling may be felt at the side of the uterus.

Stomach.—There is usually an irritable condition of the stomach, with nausea and vomiting.

Bowels.—As a rule, constipation exists.

Urine.—No albumen.

Describe the symptoms and course of the grave form.

Time of Occurrence.—As a rule, the disease begins within the first two days.

Chill.—Usually occurs.

Fever.—The temperature reaches 104° or 106° F. The morning decline in the temperature is slight or absent.

Abdomen.—The intestines become distended with gas. Pressure upon the abdomen causes severe suffering.

Respiration.—The breathing is frequent and shallow, due to pressure upon the diaphragm from below.

Tongue.—The tongue is cracked and parched, and the thirst excessive.

Stomach.—There is nausea and vomiting.

Urine.—As a rule, contains albumen. It is scanty and high-colored.

Pulse.—The pulse varies from 100 to 150 or more.

Bowels.—Diarrhœa is frequent, the discharges becoming offensive and dark in color. The diarrhœa may become so profuse that the patient sinks into a condition of collapse.

Appearance of the Skin.—Jaundice may occur toward the end of the disease; the stain becomes muddy (*café-au-lait*).

Termination.—The mind, as a rule, remains clear to the last. Death may terminate the disease within thirty-six hours, but usually it is delayed for several days (from five to ten).

Describe the symptoms and course of the late form.

Time of Occurrence.—Usually begins in four or five days after delivery, but it may not make its appearance for several weeks.

Chill.—The disease begins with a chill, more or less pronounced.

Fever.—The temperature reaches 104° F., or even higher. It then falls to almost normal, followed by perspiration.

Lochia.—Normal, or somewhat deranged.

Urine.—A small trace of albumen.

Abdomen.—There is no pain or swelling; decided pressure in many cases fails to elicit tenderness.

Termination.—Day after day, and week after week, the chills recur, followed by a rise in the temperature. There is, however, no regularity in their occurrence. Finally the disease ends either

in convalescence and recovery, or the patient may pass into a typhoid state.

The disease may be mistaken for malarial fever.

What is the diagnosis between septic lymphangitis and septic phlebitis?

Lymphangitis.	*Phlebitis.*
Begins early.	Begins late.
Chill more or less severe.	Chill severe, and recurs at irregular intervals.
Temperature uniform.	Temperature, great variations associated with perspiration.
Always extends upward.	The distribution of the poison is general.
Lymphatic glands involved.	Not involved.
The disease becomes localized.	Usually extends.
Peritoneal abscesses.	General abscesses.
Abdomen painful.	Abdomen not painful.
Abdomen swollen.	Abdomen not swollen.
Tumor or swelling at the side of the uterus.	No tumor or swelling.
Constipation.	Diarrhœa.
Lochia offensive.	Lochia offensive.

How is the treatment of septicæmia divided?

Into: 1. The prophylactic treatment.
2. The curative treatment.
   a. Essential or local.
   b. Symptomatic or constitutional.

Describe the prophylactic and curative treatment of septicæmia.

PROPHYLAXIS.—This subject has been sufficiently discussed in the chapter on Antisepsis.

ESSENTIAL OR LOCAL TREATMENT.—This consists in eradicating the source of the poison by means of antiseptics.

Antiseptics employed. Corrosive sublimate is the most efficient antiseptic in use. For vaginal injections it should be used in a

solution of 1 part to 2000; for uterine, 1 part to 3000. Carbolic acid is a remedy upon which but little reliance can be placed, and it should never be used, except as a substitute for corrosive sublimate in case symptoms of poisoning with the latter drug manifest themselves; a three or five per cent. solution should be used for vaginal or uterine irrigation. Coal-tar preparations may be used.

Precautions against poisoning with antiseptics. The vagina or uterus should be freely washed out with warm distilled water after the use of an antiseptic injection.

Means for employing injections. For vaginal injections use a fountain or Davidson syringe. For uterine irrigation use Bozeman's catheter, attached to a fountain or Davidson syringe; Chamberlain's glass tube, or an ordinary soft catheter, will answer perfectly well. In case of necessity, the nozzle of a fountain or Davidson syringe may be used. In using intra-uterine injections care should be taken to guard against the entrance of air.

Frequency of antiseptic injections. Their frequency depends upon the indications. Usually they are to be given twice in the twenty-four hours. In some cases it may be necessary to employ them more frequently, three times or oftener in the twenty four hours.

Indications for local treatment. Elevation of the temperature, unless dependent upon inflammation of the breast or of the nipple, and offensive lochia. The absence of a chill is not a contra-indication.

The above symptoms call for vaginal injections, which should be continued for twenty-four hours, when intra-uterine irrigation should be employed, unless the temperature declines and the character of the lochia changes. If the temperature and lochia show no improvement after twenty-four or forty-eight hours, the uterus should then be emptied of fragments by means of Emmet's curette forceps, or the dull wire curette, and the intra-uterine antiseptic injections continued.

Symptomatic or Constitutional Treatment.—*High temperature.* The drugs usually employed to reduce the temperature are, salicylate of soda, salicylic acid, quinine, whiskey, and antipyrine or acetanilid.

Salicylate of soda is preferred to salicylic acid; either drug

should be given in doses of ten to twenty grains, every four hours; if after four doses have been administered, the temperature does not decline, the treatment should be changed.

Quinine may be given either by the mouth or by the rectum, in doses of ten to fifteen grains, three times in the twenty-four hours.

Alcohol is especially indicated as a tonic and antipyretic in grave cases. It should be given in milk at regular intervals; the quantity used in the twenty-four hours varies from eight to sixteen ounces.

Antipyrine may be given in a dose of 5 or 10 grains. Usually within an hour or two the temperature declines; if, however, this reduction does not occur, the dose may be repeated. Acetanilid may be used in full doses.

Pain. Opium may be given by the mouth, hypodermatically, or by the rectum. It should be given in large doses if peritonitis is present.

Sleeplessness. Give opium, chloral, or bromide of potassium.

Vomiting. Use small quantities of hot water at frequent intervals, lime water, ice, or champagne. Counter-irritation to the epigastrium and hypodermatic injections of morphia are also useful.

Intestinal tympanites. Use strychnia in the form of nux vomica, rectal injections of salt water, cold applications to the abdomen, the introduction of the rectal tube, turpentine stupes, or, finally, capillary puncture of the intestines.

Bowels. A free action of the bowels should be kept up. Give either an enema of salt and water or a mild laxative. The use of calomel is highly recommended by Dr. J. C. Da Costa; he advises at first a decided dose (five to ten grains) to be given, followed by smaller doses (one-quarter to one half of a grain) repeated every hour until the bowels are freely moved.

Food. The patient should be given nourishing and easily digestible food, such as beef-tea, milk, broths, etc.

Indication for abdominal section. When the effusion into the peritoneal cavity "is chiefly liquid."

What is the serum-therapy of puerperal sepsis?

The administration of an antitoxin (antistreptococcic serum), nuclein in full doses, and normal saline injections per rectum or in the form of hypodermoclysis.

What is the value of the serum-therapy?

The value is doubtful. In a pure case of streptococcic infection diagnosed early it will probably give good results. In mixed infection the results are not favorable.

Phlegmasia Alba Dolens (Milk-leg).

What is phlegmasia alba dolens or milk-leg?

A late manifestation of puerperal sepsis, characterized by a thrombosis of the iliac or femoral veins on one side, usually the left.

What is the appearance of the affected limb?

It is immensely œdematous and milky white in color.

When does milk-leg develop?

Usually in the third or fourth week of the puerperium; occasionally in the second week.

What are the symptoms of milk-leg?

Fever (101–103° F.) preceded by a chill; malaise; gastro-intestinal disturbance; rapid, full pulse; pain in the limb, and the œdema already noted.

What are the terminations of the disease?

1. Complete resolution;
2. Suppuration with local abscess-formation;
3. General pyæmia;
4. Gangrene and death.

What is the prognosis?

Guarded; there is a mortality of 33 per cent.

What is the treatment?

That of ordinary sepsis, with rest of the limb and anodyne poultices and ointments; should abscess result, free incision is necessary, and should gangrene occur amputation of the limb is imperative.

OBSTETRIC OPERATIONS.

The Induction of Premature Labor.

What are the indications?

The induction of premature labor is justifiable in cases in which the life of the mother or child, or both, are in danger, from the further continuance of pregnancy or delivery at term.

1. *In the Interests of the Child.*
   - *a.* Habitually large size of the fœtus, and premature ossification of the fœtal head.
   - *b.* Habitual death of the fœtus in the latter part of pregnancy.
   - *c.* Pelvic deformity and neoplasms.
2. *In the Interests of the Mother.*

Among the conditions requiring the induction of premature labor may be mentioned the following: Uterine hemorrhage (accidental and unavoidable); hyperemesis; acute and chronic affections of the heart and lungs; polyhydramnios; ascites; abdominal tumors; albuminuria; eclampsia; and chorea.

How may we arrive at a probable conclusion as to the size of the fœtus?

1. A history of large children in previous pregnancies.
2. The health and size of the mother.
3. The size of the father.
4. The period of the woman's sexual life; children born early or late in life are not as large as those born during the intervening period.
5. The number of previous pregnancies: the size of the fœtus increases with the number of births.

What is the best time to induce premature labor?

1. *Habitually Large Size of the Fœtus.*—One or two weeks before full term.

2. *Habitual Death of the Fœtus in the Latter Part of Pregnancy.*—Before the period at which, according to previous experience, the death of the fœtus is expected. The operation is not indicated in habitual death of the fœtus from syphilis or organic diseases.

3. *Pelvic Deformity and Neoplasms.*—The following table is taken from Charpentier:

a. Pelvis of 9½ cm. (3.5 in.). In a multipara labor should be induced at eight months one week, to eight and a half months. In a primipara wait until term, or, at least, do not induce labor till eight or ten days before term.

b. Pelvis of 9 cm. (3.3 in.). Eight months to eight and a half.

c. Pelvis of 8 cm. (3.1 in.). Between eight and eight and a half months.

d. Pelvis of 7¾ cm. (2.9 in.). Between seven and a half and eight months.

e. Pelvis of 7 cm. (2.7 in.). Between seven months and seven months three weeks.

f. Pelvis 6½ to 6 cm. (2.5 to 2.3 in.). At seven to seven and a half months.

Below 6 cm. (2.3 in.), abortion should be induced. All of the above measurements refer to the antero-posterior diameter of the inlet.

4. *In the Interests of the Mother.*—The condition of the mother necessarily determines the time of inducing labor. The longer the operation is delayed, however, the more favorable the prognosis for the fœtus. The child is viable at the end of the seventh month, but the period of viability is now placed earlier, since artificial feeding (gavage) has enabled children to live who were born prior to that time.

What is the prognosis in the induction of labor?

The prognosis should be guarded; it is unnatural and the liability to puerperal diseases is greater.

What are the methods in use for inducing labor?

1. *The Introduction of an Elastic Bougie, or Catheter, between the Membranes and the Walls of the Uterus.*—The bougie is carefully introduced until the instrument is almost entirely within the uterine cavity, and allowed to remain until the os is dilated. A tampon is rarely necessary to keep the bougie in position. By leaving two inches of the end of the instrument outside the cervix it rests upon the vaginal wall and prevents the bougie from slipping out of the uterus. In primiparæ it may be necessary, in some

cases, to dilate the cervix by the fingers or dilators, before resorting to the bougie; or vaginal douches may be employed. Labor usually follows the introduction of the bougie in the course of a few hours. Should labor not occur within forty-eight hours some other method should be employed.

2. *Artificial Dilatation of the Cervix.*

a. Barnes's dilators.

b. Tarnier's dilator.

Tupelo or sea-tangle tents were formerly resorted to as preparatory to other means. They are not now used.

3. *Douches.*—Use a fountain syringe holding a gallon of water, at a temperature of 106° F. At first use three douches in the twenty-four hours; each injection lasting from ten to fifteen minutes. Later on the number and duration of the injections depend upon the effect produced, and upon the rapidity with which delivery is to be accomplished. The number of douches required depends upon the case; usually twelve injections are all that are necessary. "The douche acts by the warmth of the water, by stimulation of the lower uterine segment, and by dilatation of the vagina."

4. *Rupture of the Membranes.*

How would you induce labor in an ordinary case?

Give a vaginal injection in the afternoon, followed by the introduction of a bougie, which is left in the uterus over night. If necessary, repeat the injection next morning; usually, however, within twenty-four hours the cervix is soft and dilatable. Barnes's dilators should now be used to complete the dilatation. The subsequent care of the case depends upon circumstances; as a rule, the case is left to nature. Occasionally, however, the delivery is accomplished by version, or the use of the forceps.

The Induction of Abortion.

What are the indications?

The induction of abortion is justifiable whenever the operation offers the only chance of saving the life of the mother.

1. *Diseases of the Mother dependent upon Pregnancy.*—Hyperemesis is one of the most frequent indications.

2. *Diseases of the Mother independent of Pregnancy.*—Diseases of the heart, lungs, and kidneys, when the symptoms are peculiarly grave, may be mentioned as among the indications.

3. *Obstruction of the Birth-canal, due either to Pelvic Deformity or Neoplasms.*—In cases of extreme pelvic narrowing, the woman may elect either the induction of abortion or Cæsarean section.

4. *Uterine Displacements.*—Retroversion or retroflexion, with incarceration, and cases of procidentia which are irreducible.

5. *Diseases of the Ovum.*—Acute hydramnios; cystic degeneration of the chorion.

What is the best time to induce abortion?

If the induction of abortion be decided upon for disease, the time is, of course, a secondary consideration; the condition of the patient is of first importance. The best time to induce abortion is during the first two months, or after the fifth. It is between these periods that serious hemorrhage and retention of secundines are likely to occur. If the operation is indicated on account of pelvic deformity, the following table, taken from Lusk, will guide us as to the latest period it may be performed:

Antero-posterior diameter of pelvis.	*Latest period for inducing abortion.*
One and a half inch.	Beginning of sixth month.
One and a quarter inch.	Beginning of fifth month.
One inch.	Four months and a half.

What is the prognosis?

Generally good; however, it depends upon the condition of the patient, and the cause.

What are the methods in use for inducing abortion?

There is but one safe method of inducing abortion, namely, dilatation of the os, followed by tearing away of a piece of the ovum and the introduction into the cervix of a strip of gauze. If this fails, the finger, placental forceps, or curette must be employed.

In late abortions, *i. e.*, after the fifth month, the methods are the same as for the induction of premature labor.

Version, or Turning.

What is version?

Version is an operation by means of which one presenting fœtal part is changed for another.

How is version divided?

Into 1. *Cephalic version*, or the substitution of the head for the shoulder or pelvis.

2. *Pelvic version*, or the substitution of the breech for the shoulder or head.

3. *Podalic version*, or the bringing down of one or both feet; this operation is a variety of pelvic version.

Cephalic Version.

What are the methods of performing cephalic version?

1. Internal and external version.
2. External version.

Describe the operation of version by the internal and external methods.

1. *Wright's Method.*—"Suppose the patient to have been placed upon her back, across the bed, and with her hips near its edge, the presentation to be the right shoulder, with the head in the left iliac fossa, the right hand to have been introduced into the vagina, and the arm, if prolapsed, having been placed as near as may be in its original position, across the breast. We now apply our fingers upon the top of the shoulder, and our thumb in the opposite axilla, or on such part as will give us command of the chest, and enable us to apply a degree of lateral force. Our left hand is also applied to the abdomen of the patient, over the breech of the fœtus. Lateral pressure is made upon the shoulders in such a way as to give the body of the fœtus a curvilinear movement. At the same time, the left hand, applied as above, makes pressure, so as to dislodge the breech, as it were, and move it toward the centre of the uterine cavity. The body is thus made to assume its original bent position, the points of contact with the uterus are loosened, and

perhaps diminished, and the force of adhesion is in a good degree overcome. Without any direct action upon the head, it gradually approaches the superior strait, falls into the opening, and will, in all probability, adjust itself as a favorable vertex presentation. If not, the head may be acted upon as in deviated positions of the vertex, or it may be grasped, brought into the strait, and placed in correspondence with one of the oblique diameters."

2. *Braxton Hicks's Method.*—"Introduce the left hand into the vagina, as in podalic version, place the right hand on the outside of the abdomen, in order to make out the position of the fœtus, and the direction of the head and feet. Should the shoulder, for instance, present, then push it with one or two fingers on the top, in the direction of the feet. At the same time pressure by the outer hand should be exerted on the cephalic end of the child. This will bring down the head close to the os; then let the head be received upon the tips of the inside fingers. The head will play like a ball between the two hands, it will be under their command, and can be placed in almost any part at will. Let the head then be placed over the os, taking care to rectify any tendency to face presentation. It is as well, if the breech will not rise to the fundus readily after the head is fairly in the os, to withdraw the hand from the vagina, and with it press up the breech from the exterior. The hand while retaining gently the head from the outside, should continue there for some little time, till the pains have insured the retention of the child in its new position by the adaptation of the uterine walls to its form."

What are the conditions necessary for version by the internal and external methods?

1. Fœtus movable in utero; the membranes may or may not be intact.

2. The cervix dilated or dilatable; Hicks's method is available when the os is but slightly dilated.

What are the indications for version by the internal and external methods?

For the safety of the mother or child, or both.

a. Transverse presentations.

b. Accidental or unavoidable hemorrhage.

c. Cases of contracted pelves.
d. Prolapse of the cord.

Describe the operation of version by the external method. See fig. 62.

Suppose the position of the shoulder to be a R. D. A., *i. e.*, the head in the left iliac fossa and the breech upon the opposite side. The obstetrician standing on the right side of the patient, places his right hand upon the fœtal head, while his left makes pressure upon the breech. The pressure upon the fœtal head is directed downward toward the pelvic inlet, while the breech is pushed upward toward the fundus of the uterus. When the head has been brought to the inlet, the patient is placed upon her left side, and if labor has begun the membranes are ruptured; if labor has not begun, then a compress and bandage should be applied.

When may external version be performed?

1. In the latter part of pregnancy.
2. In the beginning of labor.

What are the most important indications?

Transverse presentations of the fœtus. It is also advised by some authorities in breech presentations. However, we do not recommend the operation under these circumstances, as it is useless in multiparæ, while in primiparæ, where cephalic version would be indicated, it is, as a rule, impossible to perform.

What are the conditions necessary for version by the external method?

1. The diagnosis must be certain.
2. The uterus must not be irritable.
3. The fœtus must be movable; as a rule, the membranes must be unruptured.

Pelvic Version.

When may pelvic version be performed?

1. In the latter part of pregnancy.
2. During labor.

What are the methods of performing pelvic version?

1. The external method.
2. The internal and external methods.

The operation by the external method is similar to that employed in cephalic version. Parvin succeeded in changing a shoulder presentation to that of a breech, by placing the woman in the knee-chest position, and, at the same time, making pressure upon the shoulder.

Version by the internal and external methods is accomplished by introducing one or two fingers into the uterus and pushing upon the presenting part, while the other hand, placed externally, directs the head toward the fundus.

When is pelvic version indicated?

External version is indicated whenever the breech lies closer to the pelvic inlet than the head. The operation, however, is rarely employed, as cephalic version may be performed in most cases.

Version by the internal and external methods is indicated in neglected shoulder presentations; or it may be employed as a preliminary step in podalic.

Podalic Version.

What are the indications for podalic version?

1. Transverse or oblique positions, where cephalic version cannot be performed or is contraindicated.
2. Conditions which endanger the life of the mother—for instance:
   - *a.* Hemorrhage.
   - *b.* Eclampsia.
   - *c.* Rupture of the uterus.
3. Conditions which endanger the life of the child—for instance:
   - *a.* Certain face presentations.
   - *b.* Prolapse of the cord.
   - *c.* Pelvic tumors.
4. Pelvic deformity.

What are the methods of performing podalic version?

1. The bi-polar method of Braxton Hicks.

2. Internal version—*i.e.*, the introduction of the entire hand into the uterine cavity.

What are the conditions necessary for version by Hicks's method?

1. Slight dilatation of the cervix.

2. Mobility of the fœtus; the operation, although more difficult, is not always impracticable after rupture of the membranes.

3. A positive diagnosis as to the position of the fœtus.

Describe Hicks's method of performing podalic version.

Place the patient upon her side or upon her back; the latter position is the one most generally adopted in this country. The bladder and rectum should be emptied. The patient should be under anæsthesia. The hand selected for internal manipulation should correspond in name to the side of the pelvis toward which the feet of the fœtus are directed. Two or three fingers are introduced through the internal os, while the other hand is placed on the abdomen, the former making pressure directly upon the presenting part, while the latter is applied to the breech directing it down toward the pelvic cavity. When the breech has been brought down the membranes should be ruptured during a uterine contraction. After the contraction ceases seize a knee and bring it down into the vagina, while, at the same time, the external hand presses the head of the fœtus toward the fundus of the uterus. If a knee cannot be reached, make pressure upon some portion of the breech, or hook a finger into the fold of the thigh and bring the pelvis down.

What are the conditions necessary for version by the internal method?

1. The cervix should be dilated.

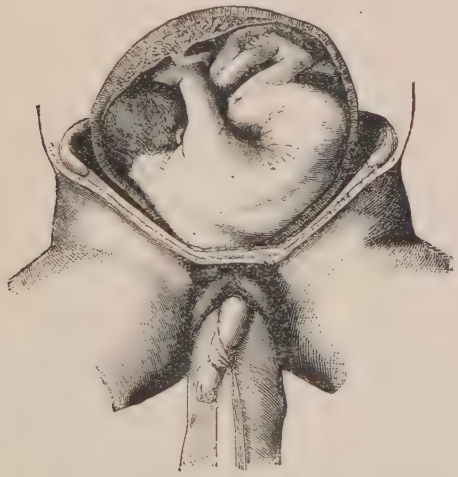
2. The presenting part should not have become fixed.

3. The pelvis must be large enough to allow the fœtus to be delivered after turning.

Describe the internal method of performing podalic version. See fig. 63.

Have the bladder and rectum emptied; the patient under anæsthesia; her buttocks over the edge of the bed, her feet placed upon chairs, and her knees supported on each side by an assistant. The operator either sits or stands between the thighs of the patient. During the interval of a uterine contraction, the hand, formed into a cone, is introduced into the vagina and is then passed up to the os uteri, at the same time making counter-pres-

FIG. 63.



Grasping the feet in podalic version.

sure upon the fundus with the external hand. If the membranes are intact rupture them, and introduce the hand at once into the uterus preventing as much as possible the escape of the liquor amnii. While searching for the feet or for a foot, fix the position of the fœtus by making pressure upon the fundus of the uterus with the other hand. To find the feet, pass the hand directly to the anterior plane of the fœtus, or follow the lateral plane until the lower extremities are found. Having reached the knee or foot, traction is to be made and the member brought down into the vagina. As

a rule, it is better to bring down only one leg, as the subsequent dilatation of the cervix is more complete, and there is less danger to the child from pressure upon the cord. As soon as the leg is brought down, into the vagina, place a noose of thick muslin around it and continue the traction. If the head cannot be dislodged by traction on the leg, assisted by external pressure, then introduce the hand into the vagina and push it up. If both feet are brought down, they are grasped by the operator and traction made, assisted, at the same time, by external pressure. If an arm be prolapsed, it is not necessary in all cases to return it. Place a noose around the wrist so as to prevent its ascension along the side of the head. In most cases, after version has been accomplished, leave the case to Nature, as in pelvic presentations. If, however, traction is necessary, it should be made at the time of a uterine contraction and assisted by pressure upon the fundus. The rules governing the delivery and the treatment of complications have already been referred to under the care of breech presentations. The question as to which hand to use internally is decided "by observing that when placed between pronation and supination it corresponds with the anterior plane of the fœtus."

The Forceps.

What are the powers of the forceps? See figs. 64 and 65.

1. *A Dynamic Action.*—Uterine contractions are sometimes increased after the introduction of a single blade of the forceps. This result, however, is far from being constant.

2. *As Compressors.*—The forceps should never be used as compressors. The compression should be sufficient only to prevent the instrument from slipping. The compression of a diameter over one-third of an inch is liable to produce fractures.

3. *As Levers.*—A "to-and-fro movement" should be associated with traction. Lusk holds that the "side-to-side swaying of the forcep-handles" is injurious to the maternal tissues.

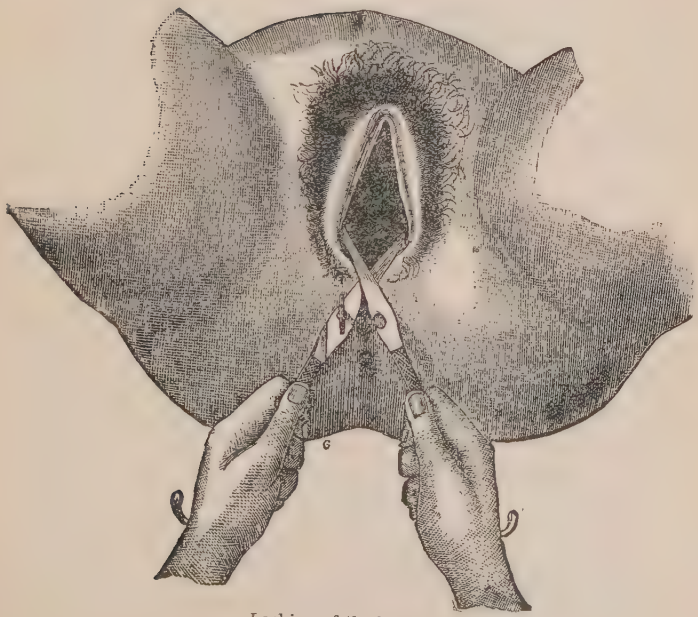
4. *As Rotators.*—The use of the forceps as rotators is not, as a rule, advised. It is used only in chin and brow presentations.

5. *As Tractors.*—This is the chief and essential power of the forceps. Traction should be intermittent and slow; imitating

FIG. 64.

The forceps.

FIG. 66.



Locking of the blades.

Nature as closely as possible. The force exerted should not exceed 132 pounds, and the pulling should be done by the forearms. The direction of the traction should correspond with the axis of the parturient canal. The axis of the birth-canal has already been described, and, therefore, requires no further reference. To effect axis-traction two methods have been described. One known as Smith's, the other as Pajot's. In the former, the operator grasps the handles of the forceps at the end, while the

FIG. 65.

Traction with Tarnier's forceps.

other hand makes downward pressure beyond the lock. In the latter, "we apply the left hand as near as possible to the vulva, the right hand near the end of the handles; then we use sometimes these two hands in order to make the forceps, at times a lever of the first order, sometimes of the third, sometimes a lever and a tractor at the same time, sometimes a direct tractor, according to the resistance and the height of the pelvis at which they are found." The best method, however, of securing axis-traction is by the use of Tarnier's axis traction forceps, or by a modification of the instrument devised either by Lusk or Simpson.

What are the indications for the use of the forceps?

1. Whenever the life of the mother or child, or both, call for immediate delivery.

2. Whenever the ordinary forces of labor are unable to effect delivery.

What are the conditions necessary for the use of the forceps?

1. The membranes must have ruptured.

2. The cervix must be dilated or dilatable.

3. The fetal head must be normal in size and consistence.

4. The forceps is applied only to the head of the child. Occasionally, however, to the breech in pelvic presentations.

5. The parturient canal must be large enough to allow the child to pass through it.

6. The head must be at the superior strait. The head is spoken of as being at the superior strait when the parietal protuberances are in relation with the ilio-pectineal line.

How many acts are included in the operation of applying the forceps?

Three; viz.: 1. Introduction; 2. Locking; 3. Extraction.

What are the rules governing the introduction of the blades?

1. Apply the blades to the sides of the head.

2. "The left blade is always held in the left hand, and is always applied to the left side of the pelvis; the right blade is always held in the right hand, and is always applied to the right side of the pelvis."

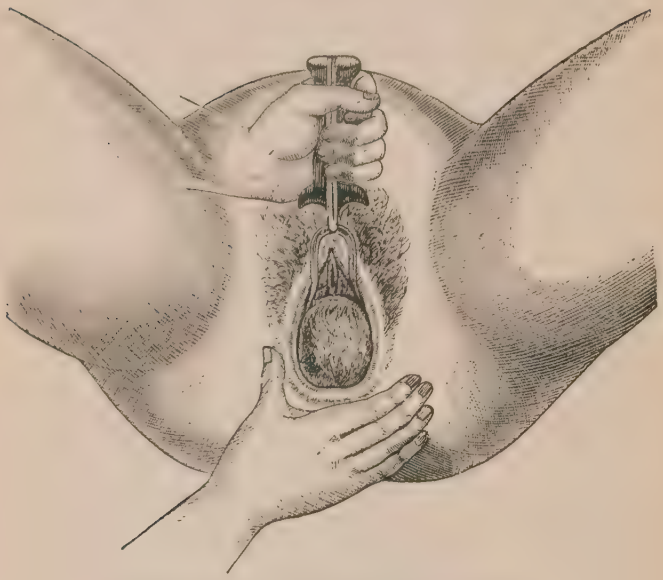
3. No force should be used in the introduction of the blades.

4. "The second blade should always be introduced above the first."

5. The hand which is to guide the blade should always be introduced first.

6. In direct applications always introduce the left blade first; in oblique, apply that blade first which corresponds in name to the empty oblique diameter. For example, in a right occipito-anterior position, the right oblique is the empty diameter, therefore apply

FIG. 67.



Position of operator when head is on perinæum.

FIG. 68.

Application of the forceps to the after-coming head.

first the right blade; or, again, in a left occipito-anterior position, the left oblique is the empty diameter, therefore the left blade is to be applied first. Generally the left blade is first applied.

What are the rules and precautions governing the locking of the blades? See fig. 66.

1. No force should be used to lock the blades.

2. In oblique applications where the right-hand blade has been introduced first and is below the left, the blades must be crossed.

3. If the handles are not in the same plane and locking cannot be effected, then rotate them inversely; or, withdraw the second blade and again introduce it; if this fails, then reintroduce both blades.

4. If locking is prevented by one blade being inserted further than the other, withdraw one blade somewhat, or push the other in.

5. The handles may not approximate, due to the head being improperly seized, or to the blades not being introduced far enough over the head, or to the head being of unusual size.

6. In locking, care should be taken to guard against including the hair or skin of the external organs of generation.

7. The indications that the forceps is properly applied are: it locks easily, it gives a sensation of firmness when a tentative pull is made, and an examination with the fingers shows that nothing has been included in its grasp but the head.

Describe how the extraction is accomplished. See fig. 67.

The handles should be grasped with the left hand, with the palm turned downward. If the handles be provided with transverse shoulders, the index-finger is placed over one shoulder, while the middle finger grasps the other. The right hand should grasp the handles beyond the position of the right, with the index-finger extended and in contact with the child's head. Or the left hand may grasp the handles from below, with the palm turned upward. Traction should not be continued longer than from one to two minutes at a time. There should, as a rule, be no haste in effecting delivery. If uterine contractions are present, traction should be made during a pain. If the head be high up, traction should be made downward and backward until the head is below the symphysis pubis; then the pull becomes horizontal in direction;

when the occiput has reached the vulva the forceps is directed up toward the mother's abdomen. When the occiput comes under the symphysis pubis, traction with the forceps is no longer indicated. Our object now is to hold the head firmly, and prevent its too rapid delivery. Not only must the perineum be supported, but it must be given time to relax, which can only be accomplished by keeping back the head. Delivery of the head should be completed in the interval of a pain, traction being made now upward and backward toward the maternal head. The fœtal head is thus carried away from the perineum and laceration prevented. The forceps is not to be removed until the head is born.

What should be the position of the patient during the operation?

If the head be in the cavity, or at the superior strait, place the patient across the bed, with her buttocks over the edge, her feet placed upon chairs, and her knees supported on each side by an assistant. If, on the other hand, the head is near the vulva, bring her to the foot of the bed, and flex the lower limbs.

Should an anæsthetic be administered?

Yes, as a rule. The anæsthesia, however, should be obstetric, not surgical, save in high forceps-operations.

What preparations should be made for using the forceps?

The bladder and rectum should be emptied. The following articles should be at hand, viz.: hot and cold water, a fountain syringe, a hypodermatic syringe, sulphuric ether, the fluid extract of ergot, and a solution of corrosive sublimate, 1 part to 3000.

Is it important to make a positive diagnosis of the presentation and position of the fœtus before introducing the forceps?

Yes. It is impossible to apply the blades or to deliver unless the presentation and position are known. If the operator is uncertain in his diagnosis, he should introduce the hand into the vagina before applying the forceps.

Describe the application of the forceps in head-first labor.

In delivering with the forceps it is absolutely necessary to remember and to assist the normal mechanism of labor.

1. *Occipito-pubic Position.*—The blades of the forceps are applied to the sides of the child's head, and are parallel with the sides of the mother's pelvis. The left-hand blade is introduced first. Traction is made downward until the occiput comes in front of the pubes, when the handles are gradually elevated toward the mother's abdomen, so as to assist extension.

2. *Occipito-sacral Position.*—The position of the blades and their introduction are the same as in an occipito-pubic position. The direction of the pull must be upward and forward, until the occiput is born over the anterior edge of the perineum, when the head becomes extended.

3. *Left Occipito-anterior Position.*—Introduce the left blade first. Rotation should not be attempted until the head occupies the pelvic floor. After rotation takes place delivery follows, as in an occipito-pubic position.

4. *Right Occipito-posterior Position.*—The introduction and position of the blades are the same as in a left occipito-anterior position. After the head reaches the floor of the pelvis, an attempt should be made to bring about anterior rotation. If this is successful, remove the blades and then reapply them. If, however, posterior rotation occurs, deliver as in an occipito-posterior position.

5. *Left Occipito-posterior Position.*—Introduce the right blade first. After the introduction of the blades the right will be below the left; to lock them cross the handles and bring the right blade above. Stolz raises the handle of the right blade and introduces the left beneath it, thus placing the blades in their proper position. The delivery is accomplished as in a right occipito-posterior position. It is general now to introduce the left blade first.

6. *Right Occipito-anterior Position.*—The introduction of the blades is the same as in a left occipito-anterior position; the delivery is accomplish as in a left occipito-anterior position.

Describe the application of the forceps in head-last labor. See fig. 68.

1. *Rotation of the Face Posteriorly.*—This is the normal rotation in a breech presentation. Raise the body of the child upward, its back directed toward the mother's abdomen. Apply the forceps to the sides of the head; the left blade first. The nucha pivots on the subpubic ligament and the head is born by flexion.

2. *Rotation of the Occiput Posteriorly.*

a. Head flexed. Carry the back of the child backward toward the mother's back; apply the blades to the sides of the head; the left blade first. The head is born by the nucha pivoting upon the anterior margin of the perineum.

b. Head extended. Hold the body of the child in a vertical position, its anterior plane being directed toward the mother's abdomen. Introduce the blades to the sides of the head; the left blade first.

Describe the application of the forceps with the head movable above the inlet.

The head is held in position by an assistant making pressure upon the lower part of the abdomen of the mother. It is almost impossible to apply the blades to the sides of the child's head. As a rule, they assume an oblique position with reference to the head. Thus, the left blade is placed over the right side of the frontal bone, while the right blade passes over the occipital bone on the left side. If, after a fair trial, the head cannot be made to descend into the inlet, the forceps must be abandoned, and some other method of delivery instituted.

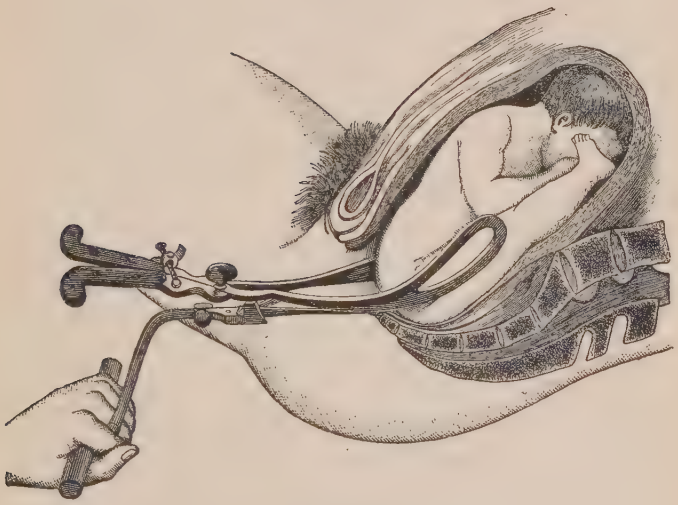
Describe the application of the forceps when the head has become separated from the body.

Fix the head by pressure upon the mother's abdomen, and apply the blades to the sides of the child's head; or fix the head by introducing the hand into the uterus.

Describe the application of the forceps in face presentations.

If the chin rotates posteriorly, the application of the forceps is unjustifiable. Delivery cannot be accomplished unless the chin rotates anteriorly. If the head be above the pelvic inlet, the application of the forceps is both dangerous and difficult: therefore, the presentation should be converted into a vertex, or podalic version performed. If, however, the head be at the superior strait, or in the pelvic cavity, the application of the forceps follows the same rules as in other presentations. The application of the blades should always be upon the sides of the head. In transverse

Fig. 69.



Tarnier forceps applied to the thighs. (Ollivier.)

positions, however, this cannot be accomplished; under these circumstances, "one blade is placed upon the cheek and the base of the jaw, while the other is upon the temporo-occipital region of the opposite side."

Describe the application of the forceps to the breach. See fig. 69.

1. *Child Dead.*—Apply the forceps to the sides of the pelvis, and make firm compression and deliver.

2. *Child Living.*—Great care should be taken to prevent injury to the bones of the pelvis. Tarnier's axis-traction forceps is the best instrument to use. The breech is seized by the sacro-pubic diameter or by the bistrochanteric. The delivery must be gradual, and without force.

Embryotomy.

What is embryotomy?

The operation "employed to lessen the size of the fœtus, facilitating or rendering possible its transmission through the birth-canal." (Parvin.)

What operations are included under the term embryotomy?

1. Craniotomy; 2. Cephalotripsy; 3. Cranioclasty; 4. Lamination; 5. Decollation; 6. Evisceration; 7. Spondylotomy.

What are the indications for the performance of embryotomy?

When there exists a disproportion between the fœtus and the parturient canal, and the fœtus is dead. Since the introduction of symphysiotomy many conditions that were formerly regarded as indications for embryotomy are no longer so considered.

1. Fœtus.
   - *a.* Increased size due to pathological causes, as, for example, hydrocephalus.
   - *b.* Monstrosities.
   - *c.* Neglected shoulder presentations.
   - *d.* Anomalies in the mechanism of labor, as, for example, a posterior rotation of the chin, in a face presentation.
2. Mother. (Cæsarean section or symphysiotomy is better.)
   - *a.* Pelvic deformity.
   - *b.* Neoplasms and cicatrices.

Narrowing of the birth-canal as an indication for the performance of embryotomy will be considered in full in the chapter on *Cæsarean Section.*

In what presentations may craniotomy be performed?

In a presentation of the vertex or of the face, or the after-coming head.

Describe the method of operating in craniotomy. See figs. 70 and 71.

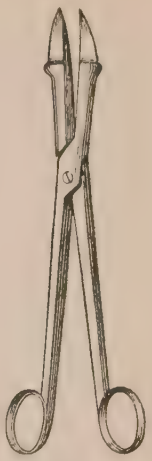
1. *Vertex Presentations.*—Place the patient in the position already described for the application of the forceps. The bladder and rectum should be emptied; anæsthesia is necessary, as a rule. The best instrument for perforation is Smellie's scissors, or one of its modifications. If an attempt has been made to deliver with the forceps prior to perforation, it is well to allow it to remain applied to the head and perforate between the blades. If, however, the forceps has not been introduced, the fœtal head is rendered immovable by pressure upon it through the abdominal wall. Two fingers of the left hand are introduced into the vagina, and their tips brought into contact with the fœtal head; the perforator, held in the right hand, is guided by the fingers in the vagina until its point comes against the cranium of the fœtus. The point of the instrument is now pressed against the skull and rotated from right to left, and from left to right, until it perforates the bone. After the instrument has entered the brain-cavity the blades are separated and the opening enlarged. The instrument is now thrust deep down into the brain-substance and moved about in every direction, so as to destroy completely the structures at the base of the brain. It is better not to perforate the skull through a suture or fontanelle, as the opening is more liable to remain patulous if made directly through the bone. As a rule, it is unnecessary to evacuate completely the brain-substance; if, however, it be thought best to do so, a warm solution of corrosive sublimate, 1 part to 4000, thrown in from the nozzle of a syringe, will entirely empty the cranial cavity. The delivery of the fœtus may now be accomplished with the crotchet, or, better still, with a cranioclast, or a cephalotribe.

2. *Face Presentations.*—Perforation is best done through the orbit. The instrument may be made to enter the brain either

Fig. 70.

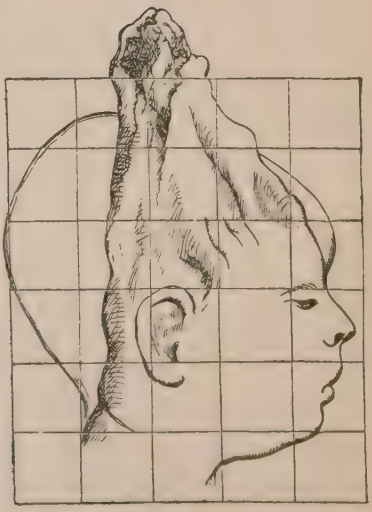
Craniotomy.

Fig. 71.



Smellie's scissors.

Fig. 72.



Head of child after delivery with the cranioclast. (Simpson.)

through the frontal bone or the palatine arch; the last situation is the most difficult.

3. *The After-coming Head.*—The body of the child is held out of the way by an assistant, and the perforator made to enter the cranium through one of the posterior lateral fontanelles. Perforation may also be accomplished either under the chin or through the palatine vault. The extraction of the head is accomplished with the cephalotribe.

What is cephalotripsy?

An operation by which the fœtal head is crushed, in order to diminish both its size and resistance.

Describe the method of operating in cephalotripsy.

The patient should be anæsthetized and placed in the position advised for the application of the forceps. The blades of the cephalotribe are introduced along the sides of the head. The general rules for the application of the instrument are the same as those given for the forceps. Perforation should always be performed before the cephalotribe is applied. The crushing of the fœtal head should be slow and intermittent. Later, however, the process must be more rapid, or the instrument will slip when traction is made. In making traction the instrument should be grasped in both hands. A quarter rotation of the cephalotribe is now made, which brings the crushed diameter of the fœtal head into the antero-posterior diameter. Traction, associated with a side-to-side movement, is then made, as in extraction with the forceps. It is of first importance to remember, in the application of the blades of the instrument, to introduce them well over the base of the skull.

Describe the method of operating in cranioclasty. Fig. 72.

The cranioclast consists of two blades, one of which is fenestrated and smooth, while the other is roughened and fits into the first.

Perforation of the skull should always be performed before the cranioclast is applied. The solid blade is introduced within the cranial cavity, and the fenestrated blade is applied without. When locked the former blade fits into the concavity of the latter. After

crushing the bones, the instrument may either be withdrawn, and the case left to Nature, or the head may be delivered by traction.

What is meant by lamination?

An operation by which the fœtal head is divided into several segments.

What is meant by decollation or decapitation?

An operation by which the fœtal head is separated from the trunk.

What is the indication for this operation? See fig. 74.

In a shoulder presentation when version is impracticable, either on account of a threatened rupture of the uterus or of the presenting part becoming impacted; also in impacted twins.

How is the operation performed? See fig. 73.

Prof. Parvin recommends that a piece of stout twine be introduced through the eye of a blunt hook and carried around the neck of the fœtus. Each end of the twine is now tied to a piece of wood, and crossed. The neck is then divided by a saw-like movement given to the string. Dubois recommends making traction on the prolapsed arm, and then carrying a blunt hook over the neck. He then with a pair of blunt-pointed scissors separates the head from the trunk. Another excellent plan is cutting the neck with an écraseur.

What is spondylotomy?

An operation by which the spinal column is divided at any part except the neck. The operation may be performed with the scissors of Dubois.

What is evisceration?

The removal of the viscera from the thoracic or abdominal cavity.

When is the operation indicated?

In a shoulder presentation where decollation is impossible; in certain cases of great pelvic narrowing; in monstrosities.

How is the operation performed?

With the scissors of Dubois or an ordinary perforator. In re-

FIG. 73.

Decapitation.

Fig. 74.

Neglected shoulder presentation, section through frozen corpse. (Chiara.)

moving the viscera the volsella forceps may be used to aid the fingers. After the contents are removed podalic version may be performed, or the blunt hook or the crotchet employed to effect delivery. If an arm is prolapsed, it may be seized and traction made, delivery being effected as in spontaneous evolution of the shoulder.

What are the advantages of Tarnier's basiotribe?

It is a perforator and a cranioclast combined. It also breaks the base of the head by crushing, not by penetrating it, as some of the other instruments do.

Symphysiotomy.

What is symphysiotomy, or Sigault's operation?

The operation of cutting through the pubic symphysis for the purpose of increasing all the diameters of the pelvic canal.

What are the indications for this operation?

1. Pelvic contraction between 8 and 7 cm. (3.1 to 2.7 inches); 2. Persistent mento-posterior position when the child is living; 3. Occasionally in occipito-posterior positions; 4. Occasionally when there are small pelvic tumors.

What is the best method of performing symphysiotomy?

The Italian or subcutaneous method.

Describe the operation of symphysiotomy.

After thorough asepsis of the abdominal surface, pubes, genitalia, and perineum, the woman, thoroughly anæsthetized, is placed in the lithotomy position at the edge of the table. An incision 1½ to 2 inches long is then made in the median line, ¾ inch above the symphysis, down to the recti muscles, which are then partially severed from the pubic rami, and the left index finger passed down to the lower margin of the inner surface of the symphysis. A metallic catheter having been introduced into the urethra and this organ displaced downward and to the right, the Galbiati knife is introduced through the incision and made to hook under the symphysis; then by a rocking movement the

joint is severed from below upward and from within outward. The resulting hæmorrhage is checked by a wedge of iodoform-gauze.

What effect has this operation upon the contracted pelvis?

It increases the conjugate diameter 1½ cm. (⅝ in.), the oblique diameters 3½ cm. (1.3 in.), and the transverse diameter 3 cm. (1.1 in.).

What is the next step in the treatment?

Forceps are applied and the child is rapidly delivered, considerable gaping of the symphysis being prevented by pressure on the sides of the pelvis. Occasionally the delivery may be left to nature.

What is the after-treatment of symphysiotomy?

The abdominal wound is closed as after an ordinary abdominal section, and a firm abdominal and pelvic binder applied. The patient is confined to bed for three to five weeks.

What are the dangers of the operation?

1. Sepsis; 2. Vesico-vaginal and urethro-vaginal fistulæ; 3. Hæmorrhage; 4. Subsequent interference with locomotion; 5. Injuries of the soft structures.

The Cæsarean Section.

What is the Cæsarean section?

An operation which consists in making an incision into the abdomen and the uterus, in order thus artificially to deliver the fœtus.

What term is used as a synonym for the Cæsarean section?

Gastro-hysterotomy.

What is meant by the "conservative Cæsarean section," or "Sänger's operation?"

The operation of gastro-hysterotomy as now performed. As Sänger is entitled to much of the credit in the technique of the operation, his name has become associated with it.

What are the indications for gastro-hysterotomy?

1. Pelvic deformity; 2. Neoplasms encroaching upon the birth-canal; 3. Carcinoma of the cervix, in an advanced stage; 4. Possibly also, for excessive size and mal-presentations of the fœtus, in cases where embryotomy would be indicated; 5. In certain anomalies of the soft parts due either to an arrest of development or to acquired malformations.

How are the indications divided?

1. *Absolute.*—When the fœtus cannot be extracted through the natural passage, living or dead.

2. *Relative.*—When we have to choose between embryotomy and gastro-hysterotomy;—*i. e.*, in cases where it is possible to deliver by the former operation.

When are the indications for gastro-hysterotomy absolute?

In all cases where the antero-posterior diameter of the superior strait is below 6 cm. (2 in.); possibly it would be better to place the limit at 2½ in. Carcinoma of the cervix in an advanced stage, and in certain anomalies of the soft parts, due to an arrest of development, or to acquired malformations.

When are the indications for the operation relative?

When the antero-posterior diameter of the inlet is between 6 and 7 cm. (2 and 3 in.). Also in excessive size and mal-presentations of the fœtus. The latter indication, however, is not accepted by all authorities.

What is the best time to perform the operation?

After the labor has been in progress for five or six hours, and before the membranes have ruptured. Under these circumstances the os uteri is more or less dilated and offers better drainage; the uterine contractions are stronger; and the liquor amnii distending the uterus assists materially when the incision is made through that organ.

Describe the operation of gastro-hysterotomy.

1. *Preliminary Preparations.*—The abdomen should be rendered aseptic in a manner similar to that employed in all abdominal

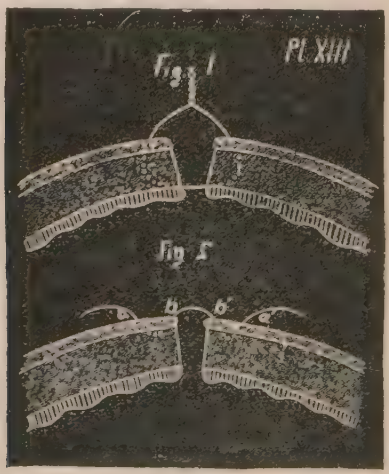
sections. The external organs, the vagina, and the cervix must be thoroughly cleansed with a solution of corrosive sublimate, 1 to 2000. The instruments, sponges, and ligatures, and the hands and forearms of the operator and his assistants must be prepared with the usual antiseptic precautions. The rectum and bladder must be emptied, and the patient anæsthetized.

2. *Incisions through the Abdomen.*—The incision should be made in the median line, about 6.3 inches long, in a line corresponding with the middle third of the uterus. This incision should be made in precisely the same manner as in ovariotomy.

3. *Incision through the Uterus.*—The incision is made in the middle third of the median line. If the placenta is in the line of the incision, cut rapidly through it, or detach one side.

4. *Delivery of Child and Eventration of the Uterus.*—Grasp the child by the feet and withdraw it, at the same time eventrate the uterus. While this is being done an assistant keeps the abdominal

FIG. 75.



The deep and superficial uterine sutures. (Zinke.)

walls closely in contact with the uterus. Before incision into the uterus has been effected, a large flat sponge, or towel, is placed behind it to protect the bowels.

5. *Hemorrhages.*—Hemorrhages may be controlled by encircling the neck of the uterus with a rubber tube, or by an assistant making compression with his hands (preferable), or by twisting the organ in its longitudinal axis.

6. *Delivery of Placenta.*—The placenta is now detached from its attachments with the fingers, and removed from the uterus.

7. *Suturing the Uterus.*—Before closing the opening into the uterus see that the internal os is patulous and, if necessary, wash out the cavity with a corrosive sublimate solution, 1 to 4000, and apply iodoform. The uterine opening is closed by two sets of sutures; deep and superficial (Fig. 75), the deep sutures being of silver wire or silk, and the superficial of silk. The former, eight to ten in number, are introduced about 1 cm. from the edge of the incision and penetrate through the peritoneal and muscular coat, down to, but not through, the decidua; they are then brought out at the same distance on the opposite side of the wound. These sutures are then secured by twisting. The superficial sutures are of silk; a large number must be used, twenty to twenty-five. Lembert's method of introducing these sutures is employed (Fig. 75).

8. *Removal of the Rubber Tube.*—The compression is now removed from around the neck of the uterus; if bleeding occurs, additional sutures should be introduced along the line of incision.

9. *Return of the Uterus into the Abdominal Cavity.*—The uterus should now be cleansed with an antiseptic solution, iodoform applied along the line of incision, and returned to the abdominal cavity.

10. *Toilette of the Abdominal Cavity.*—If fluids have gained access to the cavity of the abdomen, it should be thoroughly irrigated with hot distilled water, which has been previously boiled.

11. *Suturing the Abdominal Incision.*—The abdominal wound is closed and the dressings applied, in a manner similar to that employed in all abdominal sections.

12. *After-treatment.*—Several hypodermatic injections of ergot should be given. Vaginal injections are not indicated unless the pulse and temperature become abnormal. The general treatment is the same as in ovariotomy.

What is the Porro operation?

The extraction of the fœtus as in the Sänger operation, followed by extirpation of the uterus and its appendages.

What are the indications for this operation?

Any condition rendering a subsequent impregnation undesirable: 1. Extreme pelvic contraction; 2. Tumors of the uterus or pelvis; 3. Marked atresia of the soft parturient canal; 4. Extensive rupture of the uterus; 5. Marked relaxation of the uterus after the Sänger operation; 6. A septic condition of the uterus.

What is the technique of the Porro operation?

After the extraction of the fœtus, that of an ordinary hysterectomy.

The Post-mortem Cæsarean Section.

What conclusions have been drawn on this subject?

The following are the conclusions of Breslau, quoted by Charpentier.

1. "There can be no doubt that the fœtus, human as well as animal, survives the mother when death has been sudden, as in hemorrhage, asphyxia, apoplexy, etc."

2. "The human fœtus survives the sudden maternal death longer than the animal fœtus."

3. "The section is not likely to save the child if performed beyond fifteen or twenty minutes after the maternal death."

4. "If the mother dies of an essential fever, we cannot hope to save the infant, because its life-supplies have not been cut off suddenly, but little by little."

Under what circumstances should the post-mortem Cæsarean section be performed?

As soon as the death of the mother is established, unless it can be extracted more readily through the birth-canal.

Post-mortem Extraction through the Natural Passages.

What rules should guide us in performing this operation?

1. "Labor has commenced, cervix is dilated, or dilatable; rapid extraction by forceps, or by version."

2. "Labor has not begun.

a. "The woman is dead, or in a state of apparent death; delivery *per vias naturales*, by incision of cervix, if necessary, and forceps or version.

b. "The woman is *in extremis:* Respect her condition and do not hasten her end by manœuvres which may possibly not save the child. Once the mother is dead, however, act quickly in the interests of the child." (Charpentier.)

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